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Dear CCI Reader,

As many as 350,000 new Commodore machines may find homes over this end-of-year period. Thousands of new Commodore users will be racking their brains on how to get the best — even how to get anything — out of their new but sometimes infuriating friend. This issue of CCI is designed to help you stay sane and make it all worthwhile.

We cover the major areas you need to know about and explain how they can be best approached. There is, of course, far too much for one issue, so the next CCI will continue the story.

For long time users as well as new owners, this issue contains a great deal to excite, interest and stimulate. One feature that will benefit everyone is the CCI Readers Club through which you can get massive discounts on outstanding products. Be quick and you can get some great bargains.

You'll find, too, a questionnaire that gives you the chance to tell us what you want to see in the magazine. We look forward to your comments and suggestions, especially from long-time faithful readers.

And to the new Commodore owner, a little advice. Hang in there; stay cool; read CCI; and it will all come right.

Yours sincerely,

Antony H. Jacobson

Antony H. Jacobson
PUBLISHER

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New faces for Corby

Commodore UK is gearing up for what it likes to call its "assault" on the personal computer market, whether at home or at the office.

Preparing for its launch of several new machines this year, Commodore UK has enticed two former Plessey employees to its higher ranks in Corby.

David Gerrard, who was involved with a business computer project at Plessey, is now marketing manager at Commodore.

Mike Beale, formerly in the senior ranks at Plessey, has been appointed plant manager at the 200,000 square feet manufacturing plant at Corby, Northants.

Gerrard has experience in marketing a wide range of consumer and industrial electronic products and components.

At Commodore, Gerrard is assigned the weighty responsibility of helping to keep the company dominant in the UK home computer market. Last financial year, the company hit £100 million in sales. He also will supervise the introduction of a new range of home and business computers, including the Commodore PC and the Z8000 scheduled to be released this Spring.

Beale is a chartered production and mechanical engineer. His role at Commodore includes responsibility for all manufacturing operations at Corby, which supplies both the UK and European markets.

The other side of the big water

Commodore was expecting good sales of the C16 and Plus/4 during the Christmas season and the C16 reports are better than expected. But, according to Computergram International, Commodore apparently is not advertising the Plus/4 in the US due to a shortage of the machines, forcing the company to rely on C64 sales instead.

Meanwhile, the US parent company, Commodore International Ltd, is trying to fend off a proposed takeover, a move that began some months ago and has since had the Nassau, Bahamas headquarters sweating to fend off the attempt.

Shareholders recently voted to accept the preventive measures, including a doubling of the share capital to 90 million shares. One of the rule changes staggers the election of directors so that the entire board cannot be dumped at once.

Exposing the goofs

A UK market research group, Business Decisions, reports that Commodore's VIC 20s have a failure rate of 18 percent in the UK. And according to the survey of 100 retailers conducted for Venture UK, about 13 percent of 64 machines are returned because of product faults.

A Commodore UK spokesman says the company last year quoted a failure rate of less than one percent.

The Business Decisions survey was conducted by telephone and Commodore points out that the time period covered six months ending in October 1984. The new Corby factory was not on stream before that time. Furthermore, the survey covered returns to dealers, many of which might be prompted by other factors such as software failures or the consumer's ignorance about the machine's operation.

Nevertheless, a panel of leading computer magazines in seven countries recently voted the 64 as "Home Computer of the Year". The countries involved were the UK, the US, Germany, Italy, Spain, France and the Netherlands.

Economy boost

The electronic data processing sector will be a major boost to the growth of the UK electronics market over the next three years, according to research by Benn Electronics Publications.

The electronic data processing category includes computers, personal computers, word processing systems and computer peripherals. Benn predicts that sector will grow at the rate of 8.25 percent per year from 1985-1988.

"A prime factor in the faster growth of the UK market at 6 percent per annum over the period 1985-88 ... will be the surge in the UK EDP market ...," Benn says. The UK market is projected to be worth $6.8 billion by 1988 compared to $4.5 billion in 1984.

Contact: Benn Electronics Publication Ltd, PO Box 28, Luton LU2 0BD. Tel: 0582 417438.

Editor, Susan Pearce, presents CCI Programmers of the Year, Richard and David Darling with the Golden Joystick award

Clamps on pirating

Software pirates may be subject to strict copyright regulations if proposed legislation goes through Parliament.

Conservative Member of Parliament William Powell recently introduced a Private Member's Bill on computer software copyright, a major step in the fight initiated by the Federation Against Software Theft.

Powell, a barrister and MP for Corby, came sixth in the recent Private Member's Ballot. Powell's support is a boost to the measure and his position in the ballot means the bill may come up for consideration fairly soon.

A FAST spokesman said that, at the moment, the organisation is more concerned with mass occurrences of illegal software copying rather than isolated incidences. FAST would like to see heavier penalties and jail sentences imposed for those found guilty, particularly in the case of companies who make and distribute illegal copies.

Meanwhile, software houses are taking matters into their own hands. Durell Software, for example, have put a reward notice on the back of their latest game, Combat Lynx. The company is offering a £100 reward for pirated copies that find their way into consumers' hands. The person reporting the copy will receive a replacement and the reward if he can provide the name of the supplier and the case "leads to a successful prosecution."

The Software Registry now offers advise to UK software houses regarding US copyright law and provide a streamlined service for registering a work. That step is essential because copyright law cannot be enforced unless there is a record of ownership in the proper office.

Contact: The Software Registry, 57A Lincoln's Inn Fields, London WC2A 3LS. Tel: 01-430 0798 or 01-242 3119.

Videotex insecurity

The videotex industry is showing a few nervous twitches at reported breaches in security of communications systems.

Most recently, two break-ins occurred within days of each other in the Prestel service, after which Prestel announced it would be changing the access codes immediately. But the Daily Mail reports that one of the major Prestel customers had its system penetrated less than a day later, and Prestel quickly pointed the finger at British Telecom, saying a mole in the higher ranks was responsible.

In West Germany's videotex network, Bildschirmtext (BTX), was broken into by a group of computer whizzes who call themselves The Chaos Computer Club, according to The Financial Times. The largely Hamburg-based organisation managed to discover a fault in the BTX software, obtaining a code to access the password for Hamburger Sparkasse, a savings bank group.

The club then used the password to ring up a bill of about £36,000 by ordering pages from the club's own service.

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Commodore Comparisons

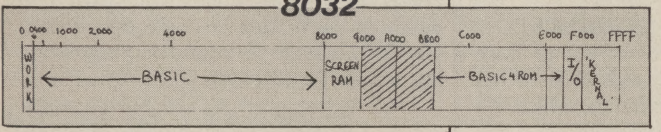
You may be a potential C16 or Plus/4 buyer, or own a 64, a VIC-20, or perhaps a CBM/PET. Many of us must have surveyed Commodore's burgeoning range of micros, and wondered what some have that others don't. Rae West takes a look at the differences, and how the newest Commodores shape up.

MEMORY MAPS

The five memory-maps summarise the design of most Commodore micros. Each computer is controlled by a 6502, or close relative running identical machine language (6510 or 7501). These chips have 64K of addressable space (ie all 64K may not be connected, but it could be). Roughly, BASIC ROMs are at the top end, and RAM for programs at the bottom end, with the mid-point, $8000 (=32768), marking a boundary. Bank switching extends memory by sharing some addresses, in the CBM8096, the 64, and the C16/Plus4.

** 8032 mem map **

This maps the CBM 8032. 2000 bytes of screen RAM start half-way, confining BASIC to 31K maximum. BASIC's ROMs extend a long way, 18K all told, because of the disk commands and other 'BASIC 4' facilities.

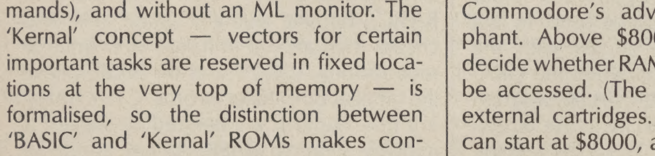


Other CBM/PET types aren't shown — there are at least 8, all more-or-less incompatible, and with different RAM availabilities too.

** VIC-20 mem map **

VIC-20 comes with the shortish BASIC 2 (no disk, graphics, or structured BASIC commands), and without an ML monitor. The 'Kernal' concept — vectors for certain important tasks are reserved in fixed locations at the very top of memory — is formalised, so the distinction between 'BASIC' and 'Kernal' ROMs makes considerable sense. The character set is stored at the half-way point: VIC chips take character information from the memory area, so character ROMs are essential for readable lettering on switch-on.

VIC-20's map is notable for the missing bits: was this to keep the price down, or to give an excuse to sell expensive memory packs? Anyway, 3K expansion packs can go in the small area, and various combinations of 8K and/or 16K RAM, or ROM, in the larger area. The area starting A000 controls auto-running of cartridges, which therefore often use A000 to BFFF, though other RAM or ROM is perfectly usable too. An 8K RAM pack can be switched into the same area; if it is, ML can be stored here without being affected by BASIC. And RAM copies or modifications of ROM software can also be put here. VIC-20 has no inbuilt bank switching.



The VIC chip is wired so the screen RAM must usually exist between $1000 and $2000. With 3K expansion, the screen shifts to $1E00, and BASIC starts at $0400. But a fully expanded VIC, with 31K RAM, has its screen starting at $1000, to making 27½K bytes the largest available BASIC program; the 3K area isn't part of BASIC.

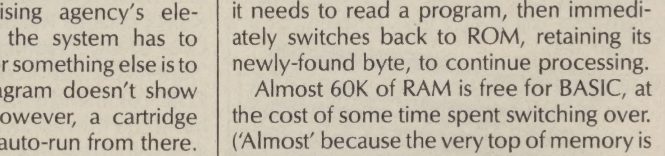
As we can see, BASIC's starting position, and/or the screen pokes and other graphics features don't always work on differently-configured VICs.

** 64 memory map **

64 BASIC is virtually identical to VIC BASIC. A major hardware innovation is bank-switched RAM. There's RAM everywhere in the memory map — hence Commodore's advertising agency's elephant. Above $8000 the system has to decide whether RAM or something else is to be accessed. (The diagram doesn't show external cartridges. However, a cartridge can start at $8000, an auto-run from there. A000 can also auto-run).

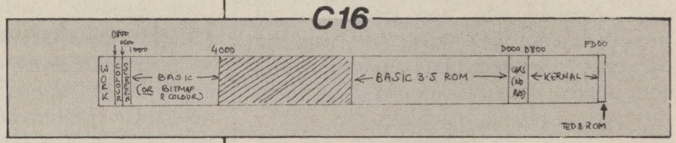
A logic array along with a couple of external lines and a couple of lines in the processor determines whether RAM, ROM, I/O or nothing at all appears at each address. The detail of the memory-map can therefore vary, allowing external cartridges to be present, and also allowing BASIC ROMs to be switched out. For BASIC-only programmers, this is confusing: for example, RAM tucked under ROM can be poked to, but is impossible to access without ML.

The portable SX-64 is similar, though the sign on colours are blue on white, not the 64's unimpressive blue on blue.



** C16 memory map **

C16 has much more extensive BASIC ROMs than any other Commodore. Its 16K of RAM sits at the low end of memory, where the first 2K — again, more than any other — is used as a workspace for all the new BASIC functions, and the screen, colour, and luminance RAMs have to coexist. This gives BASIC 12K of free memory. Unlike expanded VIC-20 and the 64, there's no isolated chunk of RAM to store ML — you have to lower the top of BASIC with something like POKE 55,0: POKE 56,32: CLR to make space above the top of BASIC, or use the tape buffer, now 819-1010.



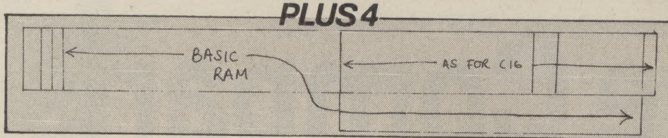
The C16 shares the Plus/4's bank switching, although it's redundant. It is built into ROM.

** Plus/4 memory map **

Plus/4 is the C16 with 64K RAM. RAM is bank-switched, but not as the 64 does it: BASIC automatically selects RAM whenever it needs to read a program, then immediately switches back to ROM, retaining its newly-found byte, to continue processing.

Almost 60K of RAM is free for BASIC, at the cost of some time spent switching over. ('Almost' because the very top of memory is always ROM or I/O chip). This arrangement does away with the criticism of the 64 that, though it's supposed to have 64K, only about 30K appears when you switch on!

Extra cartridge ROM has no obvioius place to plug in, since the top of memory is full. This is the cue for another innovation: several ROM packs can be bank switched,



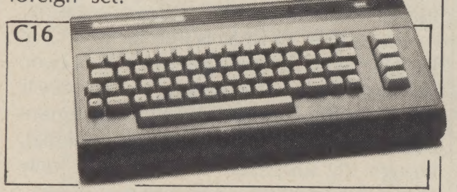
so several cartridges can be plugged in at once, and any one switch-selected by a simple poke. Part of the idea is to allow the machine to switch on and display a menu of everything that happens to be plugged in, so you can choose (maybe) chess, a word processor, or a graphics pack. Also there's freedom and power to have large ROM programs which can use each other — the graphics package borrows BASIC commands like circle and paint, for instance. In the 64, BASIC or cartridge routines can't easily be accessed once they're switched out.

Commodore seem to have had trouble deciding what to include on Plus/4's built-in software; it's a new area for them. They could for example have offered a choice, at the cost of extra hassle. The software selected is general-purpose but not very impressive.

Video and sound

Although domestic colour TVs are a cheap solution to the problem of displaying micro output, there are difficulties. 80 columns are usually unreadable; even 40-columns aren't very readable, giving colour fringing and so on, so characters and line-plotting routines use 2-dot-thick lines to help visibility.

International compatibility is another problem. Commodore concentrates on NTSC (mainly US), and PAL (most of Europe), but not SECAM (France — where a converter is needed, putting prices up and sales down). Because video displays need very precise timing, machines vary slightly internationally; for example, US 64s run slower than UK 64s, and US VIC-20s run faster than UK VICs. If transatlantic software doesn't take this into account it may not work properly on foreign micros. The C16/Plus4's TED chip is the first to select between NTSC and PAL, which ought to make for compatible international software. However, some differences, like the number of TV scan lines, can't be removed so for example a CIRCLE command with fixed parameters will always look different on a 'foreign' set!

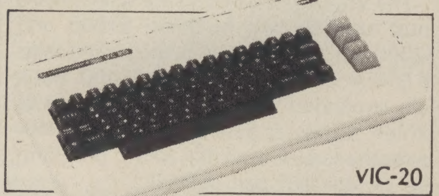

C16

VIC-20 has the original VIC chip for sound and graphics; the 64 has VIC-II, to control sound and graphics, including sprites, and SID for sound, C16/Plus4's TED, more ambitious, has sound, graphics, and some I/O too. All these chips are incompatible in every way.

VIC-20's video chip allows the display size to be changed; you can fill up the entire screen, a nice feature missing from other Commodores. But a side-effect is VIC-20 software from the US may appear off-centre or not fit the screen in the UK and vice-versa. VIC-20 has only 22 columns (unless changed). This looks remarkably large if you're accustomed to more columns. Unfortunately there's no way to simply switch the number of columns in any Commodore micro so far; special software and/or hardware is necessary.

TED allows colour intensity to be controlled, within each character, so 1K of RAM is needed to store luminance in high-res mode. With ordinary text, locations 275 through 290 store the colour keys plus luminance data. Colour combinations — like purple on red — which are hardly readable with the 64 or VIC-20 are OK on C16/Plus 4. Luminance control also offers the possibility (not used in the built-in package) of different text intensities when word-processing, like Wordstar.

C16/Plus4 has a screen bit to control flashing, rather like Apple II. All other Commodores need ML routines to do this.


VIC-20

High-resolution graphics

All post-PET/CBM micros of course have inbuilt hi-res graphics, though BASIC 2 has no special graphics commands, which is a pain for beginners. (A consumer magazine review said the 64 has no high resolution capability!).

The VIC chip is wired so it just allows a high-res screen of 20x12 enlarged characters (equivalent to 40x24 on the 64).

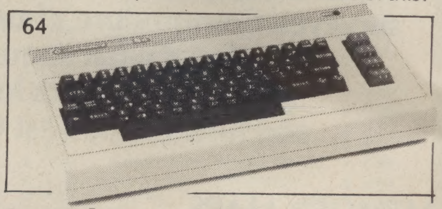
The VIC-II chip is wired with a 16K span, so a high-res screen plus sprites needs planning to fit into its 16K bank.

TED is also confined to a bank on the assumption that the same screen and colour RAM positions will always be used. In fact C16 BASIC resembles VIC-20 with the 'SuperExpander' in place: when the GRAPHIC command is used, the BASIC program has to be moved away to keep the screen area within reach of TED. This is OK with the Plus/4, leaving BASIC with about 48K of RAM, but leaves a tiny and inadequate 2K for BASIC with the C16!

Getting graphics to move smoothly on VIC-20 isn't very easy: ML has to be used to shift dot-patterns around. Motion to single or ½ character accuracy is easier.

Sprites on the 64 are technically a considerable achievement, but only eight are easily available, and they're only about three characters square at full resolution. (If the screen is split horizontally, as in 'Frogger', more sprites can be used). Sometimes, for example, 'Pool' with six balls, this is fine, but often VIC-20 type techniques are needed.

The C16, with more formalised graphics, has settled for a different system using an ordinary BASIC string of up to 256 bytes, an easy way to manipulate 2K of dots. At the time of writing I haven't checked this for speed. As we've seen, though, C16 memory isn't adequate to make much use of this!


64

Sound

VIC-20's sound is simple. Essentially it has four timers, which, on timing down to zero, flip their output, giving a square wave, the frequency of which depends on the initial value in the timer. Only 128 different values are allowed for each voice, so fine tuning, particularly at the high end, isn't possible. However, three voices are pitched an octave apart, so reasonable results are possible. The fourth voice is 'noise'.

SID ('Sound Interface Device') is the 64's synthesiser chip — designed by a musician, with three-voice, good-quality output. Like the BBC chip, but more so, it takes some effort to make SID work. A series of POKEs, or (preferably) a set of subroutines or a utility package is necessary. Also, the final, decay phase has to be activated by poking; the system hasn't its own timer, so every note needs two pokes (unless you allow the decay phase to fade the note out). Still, if you don't want to do your own programming, this isn't a problem.

The C16 resembles VIC-20, but has fewer voices, though these are tunable far more accurately. ML programmers, as with VIC-20, can tweak the system to get special effects. It has a feature missing from all other Commodores so far: PLAY allows interrupt-driven music, so a tune can play while BASIC runs. All the others can do this, but need ML.

BASIC

Commodore's first PETs used Microsoft BASIC, bought outright when this was cheap, then altered in-house ever since to save money. VIC-20 and 64 BASICs have the familiar 80-odd keywords. C16's BASIC 3.5 (the number is intended to suggest a midway stage to BASIC 4) has about 50 more commands, making a powerful and attractive language. It has some structured programming commands, making programs somewhat easier to follow, some rather low powered utilities (TRACE, RENUMBER, DELETE etc), an ML monitor, resembling SuperMon, which doesn't scroll in either direction and lists relatively few lines, graphic commands (DRAW, CIRCLE, BOX, PAINT etc), and disk commands.

On the subject of disks, note that the drive itself controls disk activity: the VIC-20 and 64 can do anything the C16 can do with disks, including handle relative files, though the commands are longer. Note also that BASIC 4 programs, if you happen to have any, won't work on the C16 without modifications, since the commands are stored differently. Simons BASIC programs won't work either for similar reasons.

The ESCAPE key on the C16 adds screen editing commands to do things like set screen windows, enhancing the usual powerful Commodore full-screen editor.

Keywords are stored as bytes with the high bit set, allowing 128 altogether. (In fact one value does allow extra keywords to be put in, overcoming this limit). As it is, some commands like DCLOSE haven't been fitted in, which is why it's been called BASIC 3.5.

Help is a function key, just like HELP in BASIC aids, which, on ?syntax error, lists whichever BASIC line crashed, signalling the error. As usual, the flagged position is only approximate. It doesn't work with ML.

Hardware

Commodore's policy is to market quite a lot of products at low price and see if they sell; they usually do. If not, they can be discreetly dropped. Commodore's newest offerings are the C16 and Plus4, with an IBM PC lookalike, and the C128, a 64-compatible micro having 2 sets of 64K RAM, on the way. The 'Amiga', subject to wrangles between Commodore and Atari, is said to be a Mac-type machine with hardware to move screen RAM around, giving real-time animation possibilities.

This hit-and-miss process hasn't so far offered any real expansion path. For example, it's misleading to talk of 'upgrading' from, say VIC-20 to C16, because they're incompatible — they can't run each others' software, except for very simple BASIC.

VIC-20, 64, C16, Plus/4

VIC-20 is not now being produced by Commodore (it's been discontinued several times!) but remains one of the most widespread micros worldwide. The 64 is outselling (in volume terms) all or most other computers. What of the C16 and Plus/4?

BASIC 3.5 is without doubt much more of a pleasure to use than any other Commodore BASIC, and compares well with any other micro. Sometimes programmers complain it makes things too easy! — They've got used to doing things the hard way. But most people will turn with relief to BASIC 3.5.

C16 is short of memory. It is a fact that the C16's ROM is designed to handle 32K of RAM; the coding is in there. The C16 may have been deliberately crippled with only 16K RAM, to be uncompetitive with the 64: after all, a new, cheap micro, with improved BASIC, showing 30K bytes on switch on, might appear too competitive with the 64.

Plus/4 has some hardware differences from the C16: 64K RAM, RS232 communication, built-in ROM software, and sockets for ROMs. Its RS232 — in hardware rather than software — isn't compatible with the converter used for VIC-20 and 64 RS232. C16 can't be used for communications, despite the fact that many VIC-20s were bought just for this purpose. Commodore have gone to some lengths to ensure that C16s can't be easily upgraded, with a few extra parts, into a 32K machine or a cheap Plus/4.

Plus/4

Peripherals

Tape storage on all Commodore computers, except the new C16 and Plus/4, is the same, painfully slow system. (SX-64 has no tape. Device 1 gives syntax errors). The new machines haven't included speed improvements in software either with tape or disk; a pity, since accelerated tape programs load faster than disk.

The actual formatting of the tape on the C16 is different, since the C16's TED is too overloaded to cope with an edge-sensitive system. So it's just not possible to read (say) 64 tapes into the C16. Rewrites of the tape system for fast loading must therefore be done anew for the C16/Plus4. The tape socket is different on the C16 from all other Commodores, and has an entirely non-standard connector.

Joysticks, tiresomely, are another C16/Plus4 non-standard item, without the familiar d-connector, using a new type of plug. You must get Commodore joysticks with this machine, unless someone starts making adaptors, which shouldn't be too difficult, except that plugs to fit the back of the machine wouldn't be available. It's hard to see why Commodore did this. Are joystick sales a big-profit item? Has Atari got a patent on d-connectors? Who knows?

1540 series disk drives are usable with all post-PET micros. Word has it the black 1542 is identical to the 1541, or perhaps has only an improved ROM. So you needn't 'upgrade' if you have a 1541 already. These disks, despite advertising claims, are dismally slow; I've heard that Commodore wanted to keep sales of their PET disks up, so they deliberately designed VIC-20 disks to work slowly! Several software and hardware devices to accelerate disks exist. Commodore has announced its own, new, faster, incompatible, drives to plug into the expansion port (the C16/Plus4 ROM has code to detect them) but don't hold your breath — word has it these will probably not be made.

Commodore now has a full range of printers, all Japanese and lowish-priced, including a daisywheel and a full-colour printer. Naturally, they use Commodore's own serial interface. Other people's printers are hard to attach. In fact, C16/Plus4's user port (the smallest edge-connector at the back of the machine) has been redesigned, making Centronics printers impossible to connect. The C16/Plus4 seems very determined to be a Commodore-only machine!

Software

All Commodores are software incompatible. The 'Kernal' idea doesn't extend to graphics and sound, two key areas. Different-sized cartridges for each micro emphasise the incompatibility. However, conversion between Commodores is easier than converting from other types of machine, so any new Commodore is likely to have converted software available as soon as programmers work out how to rewrite. Commodore supply documentation to favoured software houses for this purpose. This is not necessarily a great inducement to buy, since people may just keep their older machines with the same old programs.

New software raises problems. One is Commodore's policy. Software publishers may typically offer 10 to 15 percent of receipts. Commodore prefers to retain more like 97%. Most of the best software suppliers produce and distribute themselves. In any case some of the products backed by Commodore have proved very poor quality. This may be related to Commodore's inability to produce decent documentation — though as an author of books in this field I can hardly complain.

Piracy and copying can be a problem. Not so much with ROM software, which can be made hard to copy in several ways, as with tape and disk software, which is much cheaper and easier to make, and therefore good for smaller software houses. Unfortunately Commodore appears to have engineered almost no protection into the C16/Plus4. Its new reset switch, unlike the Stop/Restore of VIC-20 and the 64, cannot be defeated in any way, so its software seems defenceless against copying. Neither VIC-20 (needs external reset switch and memory) nor the 64 (needs reset and other ground lines) are so easy.

Another difficulty with the C16 is that if expansion memory becomes popular, as it might need to be, good graphics programs would only work on an 'expanded C16', so we'll yet again have different types of software for the same machine, as with VIC-20.

With many more (10:1?) C16s than Plus/4s being manufactured, Plus/4 software may be relatively expensive.

With these deterrents, C16/Plus4 software availability can't be assured. A 'free' tape of four programs (cost of production probably 20p) or some built-in ROM may not seem very generous by mid-1985.

Rae West is the author of the definitive 'Programming the PET/CBM' (£14.90) and the just-published 'Programming the VIC' (£15.90). His 'Programming the Commodore 64' will appear early in 1985. These books are published by Level Ltd (01-794 7241) in association with Compute! books in the USA. They are available by mail order at no extra charge from: Biblios Distributors, Star Road, Partridge Green, Horsham, W Sussex RH13 8LD.

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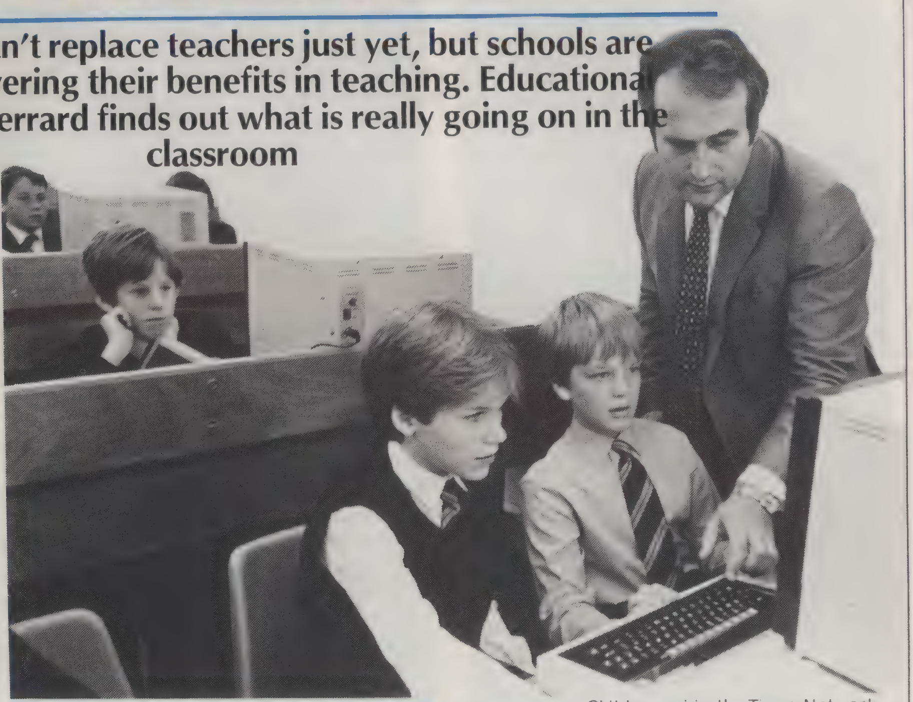
GOOD MORNING!

Computers In The Classroom

Computers can't replace teachers just yet, but schools are quickly discovering their benefits in teaching. Educational author Mike Gerrard finds out what is really going on in the classroom


Children using the Times Network

One of life's little lessons that we all very soon learn is that there is a considerable gap between theory and practice. In sport, for instance, you might know what you ought to be doing, but somehow the ball or discus never quite goes in the direction it should, or as far as it ought to do. That gap between man's aspirations and achievements is one of the staple contents of comedy the world over, and so it is that while we talk of the wonders of that grand-sounding phrase "educational technology," we all know that in most cases this is more likely to mean not the white-heat at the forefront of scientific breakthrough, but an overhead projector with the bulb gone and spares no longer available, a TV with the plug missing because a pupil's pinched it for his stereo, and a video recorder that only one person in the school knows how to (or is allowed to) operate.

Perhaps that is something of an exaggeration, but in introducing computers into the classroom it's important to remember the pitfalls as well as the potential. In fact it was the distance between the two that helped prompt a book I co-wrote recently with an ex-teacher, Bryan Skinner: *Mr Chips Comes Home* (Duckworth, £6.95). Several teacher friends, knowing I was a computer journalist, had turned to me and said things along the lines of: "I've been put in charge of the computer that's arriving next term and I don't know the first thing about them ... Help!" The theory of introducing computers and computer awareness into schools is fine, but the reality behind it is the teacher whose mechanical knowledge doesn't go beyond the ability to squeeze a tube of toothpaste.

Leading the pack

For the teacher told that "your computer's in the post" and needing to know more about the machines then there are any number of books on the market that will introduce you to micros and the terminology used, but you must first, of course, know which machine you'll be using — that may seem like stating the obvious, but certainly one or two of my teacher-friends weren't aware of the type of computer that was due to arrive. There's little point in buying a book that tells you everything you always wanted to know about the ZX-81 if you unpack the box a few months later and discover a BBC inside it.

Most teachers are normally sent on computer familiarisation courses, but from what I've heard these can be far from ideal. Some teach you little more than how to plug a computer in, while others hurl jargon in the general direction of the audience and the teachers leave more baffled and apprehensive than when they arrived.

Two organisations that can be of help in this and in other respects are MAPE and MUSE. MAPE is the abbreviation for Micros and Primary Education, and although it is mainly for teachers, membership is open to anyone having an interest in Primary Education. As well as organising training courses, MAPE offers advice on using computers in the classroom, advice on software, a journal, and meetings in its 14 regional groups, amongst other things. The organisation has been going for almost four years now, and was set up originally with the support of the MEP (Microelectronics Education Program), CET (Council for Educational Technology) and the Department of Trade and Industry. Membership currently costs £8.50, with information available by sending an SAE to Mrs Anne Liddle, MAPE Secretary, Pentland Primary School, Pentland Avenue, Billingham, Cleveland.

Both MAPE and MUSE are basically organisations run by teachers for teachers, and in addition to some of the facilities offered by MAPE (journal, regional organisations, training etc) MUSE also has a software library for all age ranges and covering most machines used in schools. MUSE is slightly more expensive at £15, and for further information contact the MUSE Information Office, Teaching Centre, Westhill College, Weoley Park Road, Birmingham B29 6LL.

If all else fails in trying to come to terms with computer terms you can always, of course, try asking the pupils, some of whom will certainly know more about micros than the teacher, and probably have more hardware than the school itself. In some of the areas my friends teach in, the hardware may well have come from the school in the first place. Asking the pupils isn't a frivolous suggestion: I know one teacher who was insufficiently prepared for her first venture into computer studies, and was glad to hand over the occasional lesson to one of her whizz-kid pupils who taught BASIC programming far better than she knew she ever could.

Weeding out the dross

Most teachers will in fact soon master the basic knowledge that they need, and then start to fall back on commercial software as being the easiest way to make use of computers in the classroom. This can be beneficial, as there are some marvellous pieces of software available, covering every subject in the syllabus (even if there isn't an

'O' Level in *Space Invaders* yet), but there is also a considerable amount of dross around. A software library such as the one operated by MUSE can be of help in enabling you to sample cheaply a range of software, though in the case of MUSE their library wouldn't contain much of the rubbish which is advertised in the guise of educational software.

Learning with the computer is fun even for the younger student

Teachers used to working with more traditional resources such as books might expect that a piece of software labelled 'educational' would have certain standards as regards spelling, punctuation etc. Not so. As just one example I would quote the 'O' Level revision program for George Orwell's *1984*which defines Ducks peak as "To speak as a duck quacks (*sic*)", and includes phrases without a trace of a possessive apostrophe: "the mornings activities" and "the Parsons children", for example. These are just a few of many mistakes in the program, and *1984* is just one example of many such programs. I've seen a spelling program which asks you to fill in the blank in the word T-NT, and if you type 'I' as an answer it responds with "You should of put 'E'". These are not isolated examples, either. I could fill a page with more, and that is without going onto the programs which are perfectly presented but are about as educational as the back of a box of matches.

Unfortunately, most of the computer magazines devote very little space to educational software, seeing their market as the games market. This is a little surprising given that the breakdown for 1983 software sales showed £26 million for games and £12 million for education, not too great a gap. If you want to keep in touch with new material coming out, though, then a subscription to the magazine *Educational Computing* will be vital. The address is 8 Herbal Hill, London EC1R 5EJ, and the magazine carries reviews of a great deal of new software (as well as books and other items of interest) although even this cannot hope to keep up with the estimated 100 new pieces of educational software being published every month — they can probably do a better job of keeping up than you can, though, and they will warn you off the truly appalling material, such as the examples quoted above.

Fun can be good

This is not to say that all educational software is poor, far from it, and there is some excellent material around, the best being those examples which use the computer's unique facilities in the way they should be used, rather than treating them as little more than mechanised books. Computers are fast, and most can produce excellent graphics and sound. Software can take advantage of these features and produce, for example, educational games based on children's arcade favourites such as *Space Invaders* and *Pac-Man*. While many teachers will no doubt be appalled at the suggestion that learning can sometimes be fun, these arcade-style packages are not to be dismissed as they can actually give a child a good incentive to learn things like multiplication tables and spellings.

Education is often thought of in the same way as medicine: it has to be bad to be doing you good. Be warned, though: it's easy to shove out a piece of software labelled something like *Maths Invaders* and pretend it's educational. If the child enjoys playing it then he or she will no doubt go along with this pretence, but it's up to the teacher to evaluate the usefulness of the package and test whether the information is actually going in or not.

At the moment the computer is still new, a novelty, and because it is used for playing games at home many teachers are no doubt suspicious, wary of allowing these monsters into the classroom to meet the monsters already there — no, not the pupils, but technological breakthroughs of the past that are also enjoyed at home, such as books, radio, tape recorders, TV and video recorders. At the other extreme are the people who think that computers are the ultimate answer to the meaning of life, the universe and the education process as well. The truth, as usual, is to be found somewhere in the middle.

Micros can be used to do things no other medium can emulate, such as making use of their moving colour graphics to recreate the perfect chemical experiment which can be stopped at any point, or repeated endlessly if desired, and as such they should take their place with the other technology that is available to the teacher.

In no way do they supersede books or other resources, which is what some of the poorer software tries to use them to do. There is no point in transferring a page of information from a book and displaying it instead on a TV screen unless the micro can add something to aid the pupil's understanding of the subject. Computers are too often used as simply expensive page turners.

The beginning, not the end

One fear that some teachers seem to have is that micros, with the attraction of their music and action, will take pupils away from boring old books and so help bring about the end of civilisation as we know it. That has not been the experience of Rosetta McLeod, who is Principal Teacher of English at Linksfield Academy in Aberdeen. Her book, *Learning with Adventure Programs* (Melbourne House, £5.95), explains how she developed work units based around three adventure programs, all originally published for the games rather than the schools market: *The Hobbit, Valhalla* and *Snowball*.

For those who may not be familiar with adventure programs, there isn't really room here to explain fully what they are, but they could be described as interactive fiction. No teacher can be unfamiliar with the game of *Dungeons and Dragons* (but if you are then ask any pupil to explain it to you), and computer adventure games are merely developments of that style of game. You must respond to the words and pictures that appear on the screen in order to overcome problems and plot your way through the story to achieve whatever goal you have been set. In *The Hobbit*, for example, the person sitting at the keyboard assumes the role of Bilbo Baggins and must aim to kill the dragon Smaug and collect the treasure that it is guarding. This is done by issuing commands to the computer, which progresses the story accordingly ... or note, as the case may be. You use commands such as GET THE MAP, READ THE MAP, GO EAST, EAT THE FOOD and so on.

The other adventures used by Mrs McLeod, *Valhalla* and *Snowball*, deal with the worlds of the Norse Gods and of science-fiction respectively. The author explains that pupils became so enthusiastic at 'living' the story of *The Hobbit* via the computer rather than merely reading the text in class that they made the "unheard of" request to take copies of the book home with them. As further evidence of the usefulness of computers in the classroom she says: "Teachers who have worked with micro-computers in Remedial departments are firmly convinced that their use can increase motivation among less able pupils, can force these children to pay more attention to detail, and may increase their span of concentration. After using adventure programs with a whole class, I can confirm these views."

Mrs. McLeod also discovered that by becoming interested in computers herself she developed a better relationship with her pupils because she was sharing one of their enthusiasms. A further advantage that adventure games have for learning is that there are no sex barriers with them. Where boys tend to enjoy the shooting style of *Invaders* game, which most girls find boring, both sexes respond equally well to adventure games and this helps to increase the interest of girls in computers themselves. As the writer of adventure columns in two magazines, I can confirm that there is a considerable response from female readers who enjoy the intellectual challenge of adventures.

Active response

Learning with Adventure Programs (which, incidentally, is ridiculously overpriced at £5.95 for just 86 pages) goes on to show examples of the pupils' responses in words and pictures to using the various programs, and sample work units based round these three adventures are given. *Valhalla,* for instance, was used in conjunction with a recording of Viking stories by Magnus Magnusson, as well as several reference books, so that the pupils came to have a better understanding of the various characters involved in the adventure, and why they responded in the way they did to the different commands typed in. ("We can't ask Loki to kill Hel because she is his daughter!")

The book concludes with a section showing how different groups of pupils then went on to write their own original adventure programs using a commercial package called *The Quill.* (Gilsoft, £14.95 for CBM 64). Briefly, this is a piece of software which contains the framework for an adventure, with you typing in the details for yourself. This is over-simplifying what is a very thorough and exciting piece of software, one which encourages creative thought, with adventure games themselves useful in school for developing reading, writing, art, comprehension and discussion skills amongst others.

To use *The Quill* requires no programming knowledge, and nor does the use of Logo, although this is in fact a kind of programming language. It is also another way in which computers can be used and can be useful in the classroom. If you're going to be familiar with computers in the classroom, then you have to be familiar with Logo, not to mention turtles. These aren't to be added to the nature table, and require a lot less attention than rabbits and guinea pigs, so don't be nervous.

The robotic turtle is simply a device which is controlled by commands typed in at the keyboard, or alternatively the turtle can just be a speck or shape on the TV screen which also responds to the commands. Either turtle can draw, leaving a trace behind it, or can move about without leaving a trace. The user can issue commands such as GO FORWARD 10 UNITS, TURN RIGHT THROUGH 90, GO BACK 15 UNITS, DRAW A CIRCLE OF RADIUS 5 UNITS, and so on, though the commands won't be worded in exactly that fashion. Each instruction will be carried out, or a series of instructions can be given to construct a certain shape, say a square.

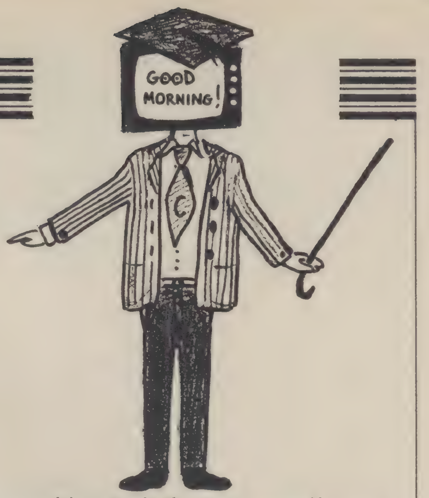
Logo is a language that learns as well as teaches, so that if you have given it the sequence of commands needed in order to draw a square, you can tell it to 'remember' the instruction SQUARE, and it will go through that sequence of commands every time you type in SQUARE, even though the word wasn't originally in its vocabulary.

If you then want to move on to draw a house combining commands such as SQUARE, CIRCLE, TRIANGLE etc, you can label the resulting sequence of moves HOUSE, and the program will retain this in its memory for future use. Anyone using Logo must learn to think logically in order to initially break down a shape into its component parts, and by building up the separate smaller routines into one large drawing routine the user will be learning how to construct computer programs without realising it, and can later go on to more sophisticated programming languages.

Micro vitality

In a world of high unemployment and a great demand for computer programmers and technicians, who can deny this classroom use of the micro? Early familiarity is very important.

Micros are vital in the classroom for this very reason, that they are now a large part of the modern world, like it or not, and teachers have a duty to their pupils to familiarise them with computer terminology as much as possible. And if you yourself aren't knowledgeable, how can you do that? Teachers also owe it to themselves, unless they feel absolutely secure in their jobs, and if they do then they're not like the teachers that I know. Micros can also do away with a lot of the drudgery of record-keeping and letter-writing, and with many programs being self-marking, individual pupils or groups can be left working with the micro and their progress quickly monitored at the end, rather than having to read through and evaluate several pages of exercises. Though the micro might take time to set up, it can be like having an extra teacher on hand during the lesson.


GOOD MORNING!

The British Government's original plans to have one micro per school were certainly laudable, but the obvious corollary of this is that you have one school per micro. Admittedly this could be useful with some of the more complicated games on the market, which seem to need about 500 hands at the keyboard simultaneously, but for educational purposes there is a limit to the number of children you should be trying to squeeze round a computer at one time. One micro per classroom is the better aim, whether it be a Commodore, Spectrum, BBC or anything else, but in an economic climate where many schools are having to rely on parents raising money simply to buy the books that they need, what chance do computers have of taking their rightful place in the classroom?

Pupils of Garth School, Bracknell, enjoying the activities provided by the Times Network for Schools — a national electronic mail and information service

University Software

UNISTAT

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UNIMAX

LINEAR PROGRAMMING PACKAGE

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MATRIX OPERATIONS: Inversion, transposition, determinant, pre- and post-multiplication, scalar multiplication, addition and subtraction of matrices and vectors. Any output can in turn be used as the input of the next operation without re-typing. Matrices can be saved or loaded at any stage. Datafile compatible with **UNISTAT** package. Capacities: **CBM-64;** 35x35, **BBC-B;** 25x25, **48K Spectrum;** 45x45.

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Computer type..............................(Commodore 64/BBC/Electron/Spectrum)
Mr/Mrs/Miss ....
Address ....
....
....Postcode ....

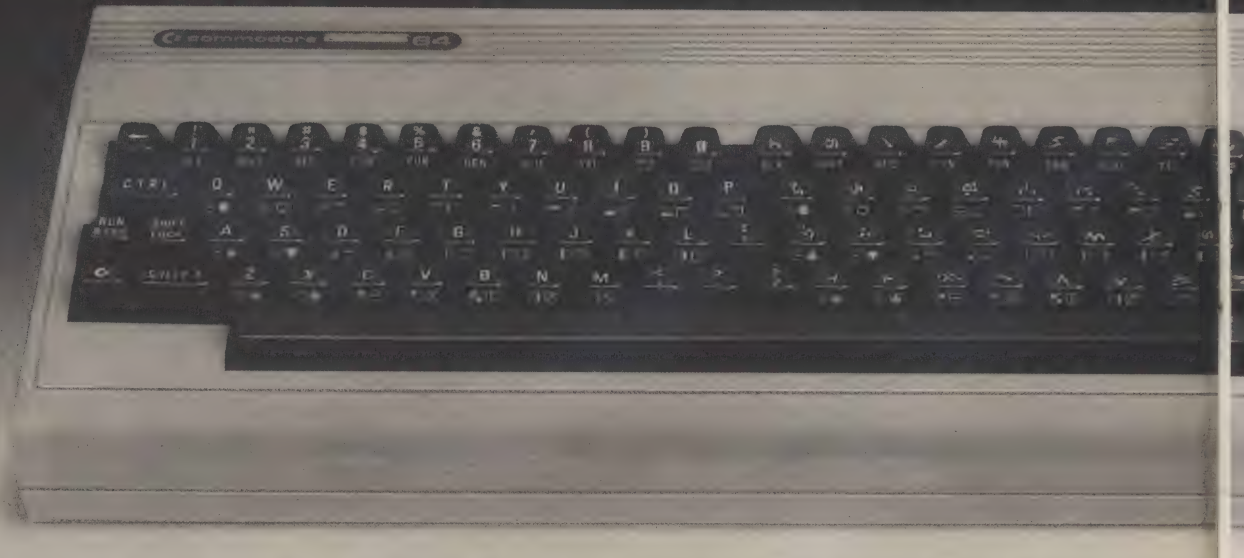
EDUCATIONAL SOFTWARE CHECKLIST

Product	Description	Age Group	Machine	Price	Company	Address
Mr. T.'s Money Box	Simple addition, coin shapes	3-7	64	Cass. £9.95	Ebury Software	72 Broadwick Street, London W1V 2BP. Tel: 01-439 7144.
Mr. T. Tells The Time		3-7	64	Cass. £9.95		
Mr. T.'s Measuring Games	Sizes, etc.	3-7	64	Cass. £9.95		
Mr. T.'s Alphabet Games	Letters & letter shapes	3-7	64	Cass. £9.95		
Mr. T.'s Number Game	Simple counting	3-7	64	Cass. £9.95		
Mr. T. Shape Games	Extending vocabulary (shapes)	3-7	64	Cass. £9.95		
Mr. T. Meets His Match	Matching games	5-11	64	Cass. £9.95		
Mr. T. In The Mystery Maze	Reasoning	7-11	64	Cass. £9.95		
Mr. T.'s Jungle Stories	Reading/vocabulary	4-8	64	Cass. £9.95		
Mr. T.'s Simple Sums	Addition/Subtraction	4-8	64	Cass. £9.95		
Mr. T. Makes Music	Musical jigsaw puzzle and music creation program	4-8	64	Cass.(2) £9.95		
Eiffel Tower	French vocabulary	9+	64	Cass. £7.95 Disk £10.95	Chalksoft	37 Willowslea Road, Worcester WR3 7QP. Tel: 0905 55192
Words and Pictures	Recognising words	3-7	64	Cass. £9.95 Disk £12.95		
Decimals	Maths	9-15	VIC 20	Cass. £9.25		
Note Invaders	Note recognition in music	7+		Cass. £9.25		
Inkosi	Survival game (Africa)	9+		Cass. £6.95		
Invisible Man	Learning compass points	7-14		Cass. £6.95		
Metrics Quiz	Metric system	10-15		Cass. £6.95		
Pascal's Triangle	Main properties & construction of Pascal's triangle	8-13		Cass. £6.95		
Sequences	Mathematical sequences	8-15		Cass. £6.95		
Bailiff	Spelling game	14+	64	Cass. £9.95 Disk £12.95	Sulis Software	4 Church Street, Abbey Green, Bath BA1 1NL. Tel: 0225 61929
Starter Word Splits	Word recognition (200 words)	4-8	64	″		
Junior Word Splits	500 words according to spelling	6-10	64	″		
Just a Mot	French vocabulary (5 topics)	12+	64	″		
Sol-de-rol	Spelling program	6-9	64	″		
Open Sesame	Spelling program	10+	64	″		
Besieged	Crossword-type spelling game	15+	64	″		
Tense French	French regular & irregular verbs with 8 tenses	11+	64	″		
Time Traveller	History games	7+	64	″		
Word Power	Vocabulary enrichment	11+	64	″		
Sixers	Game of words & logic	13+	64	″		
The Grammar Tree	3-part grammar course	13+	64	″		
Time Trucker	Time-keeping	8-14	64	Cass. £7.95	ASK	London House, 68 Upper Richmond Road, SW15 2RP. Tel: 01-814 6046
Amazing Ollie	Counting & movement skills	4-8	64	Cass. £6.95 Disk £10.95	Storm Software	Winchester House, Sherborne, Dorset. Tel: 0935 813528
Ollie Octopus' Sketch Pad	Drawing lines/shapes, pictures	4-8	64	Cass. £6.95 Disk £10.95		
Olympics '84	Olympic Games facts & figures	9+	64	Cass. £14.95 Disk £17.45		
Kids On Keys	Keyboard skills builder	3-9	64	Cass. £9.95	Spinnaker Software, Inc.	WHS Distributors, St. John's House, East Street, Leicester LE1. Tel: 0533 551196
Aegean Voyage	Learning skills builder	8-Adult	64	Cass. £9.95		
Make-A-Face	Computer skills builder	3-8	64	Cass. £9.95		
Alphabet Zoo	Language skills builder	3-8	64	Cass. £9.95		
Fraction Fever	Maths skills builder	7-Adult	64	Cass. £9.95		
Alf In The Colour Caves	Learning skills builder	3-6	64	Cass. £9.95		
Kindercomp	Learning skills builder	3-8	64	Cass. £9.95		
Up & Add 'Em	Maths skills	3-7	64	Cass. £9.95	Fisher-Price	WHS Distributors, St. John's House, East Street, Leicester LE1. Tel: 0533 551196
Number Tumblers	Maths skills	8-12	64	Cass. £9.95		
Dance Fantasy	Creative skills	4-8	64	Cass. £9.95		
Logic Levels	Learning skills	7-12	64	Cass. £9.95		
UK Geography	Geographical knowledge	10-12	64	Cass. £7.95	Superior Software	Regent House, Skinner Lane, Leeds LS7 1AX. Tel: 0532 459453
World Geography	Geographical knowledge	10-12	64	Cass. £7.95		
Flashcards Alphabet & Spelling	Basic skills (also in French and Spanish)	1-3	64	Cass. £5.00 Disk £7.50	Toddlersoft	1 Catlin Cottage, Ewelme, Oxon OX9 6HX. Tel: 0491 39066
The French Mistress	French	9-O/level	64	Cass.(2) £8.95	Kosmos Software	1 Pilgrims Close, Harlington, Dunstable, Beds. LU5 6LX. Tel: 05255 3942
The German Master	German	9-O/level	64	Cas.(2) £8.95		
The Spanish Tutor	Spanish	9-O/level	64	Cass.(2) £8.95		

CHECKLIST

Product	Description	Age Group	Machine	Price	Company	Address
Postman Pat Trail Game	Problem-solving and logic	4-6	64	Cass. £5.95	Longman	Longman House, Burnt Mill, Harlow, Essex. Tel: 0279 26721
3D Hyper Maths	Addition, Subtraction, Multiplication, Division	8+	64	Cass. £7.95		
BMX Number Jump	Addition, Subtraction, Multiplication	6-10	64	Cass. £7.95		
Word Wobbler	Spelling	8+	64	Cass. £7.95		
Exam Revision Software **Maths French Music** **Physics Biology** **Chemistry Computer Studies**	Exam Revision	CSE & O/level	64	Cass. £7.95		
First Steps With The Mr. Men	Pre-reading skills	3-8	64	Cass. £8.95	Mirrorsoft	Holborn Circus, London EC1P 1DQ. Tel: 01-822 3947
Count With Oliver	Introducing Sets	4-7	64	Cas. £7.95		
Look Sharp!	2 programs — 6 games	3-11	64	Cass. £7.95		
Quick Thinking!	Space Invaders — simple addition, subtraction, tables	7+	64	Cass. £7.95		
Caesar's Travels	(Caesar the Cat)	Very early readers	64	Cass. £7.95		
Fun To Learn	Spelling, accounting, word recognition, arithmetic	6-12	64	Cass. £6.95	Shards	Suite G, Roycraft House Linton Road, Barking, Essex. Tel: 01-591 7666
Monster Maths	5 programs	6-14	64	Cas. £6.95		
Roboforth	Extension of Forth language. Talk to different parts of the robot.		PET & 64	Robot + Cass./Disk £650	Cyber Robotics	1 Ditton Walk, Cambridge CB5 8QZ. Tel: 0223 210675
Application Software	Suite of 5 programs		PET & 64	Robot + Disk £250		
Shakespeare — **Julius Caesar - Macbeth - Merchant of Venice - Romeo & Juliet - Twelfth Night - Henry IV Part I**	Shakespeare	CSE & O/level	64	Cass. £7.95	Penguin Books	536 King's Road, London SW10 0UH. Tel: 01-351 2393

The answer to your pro



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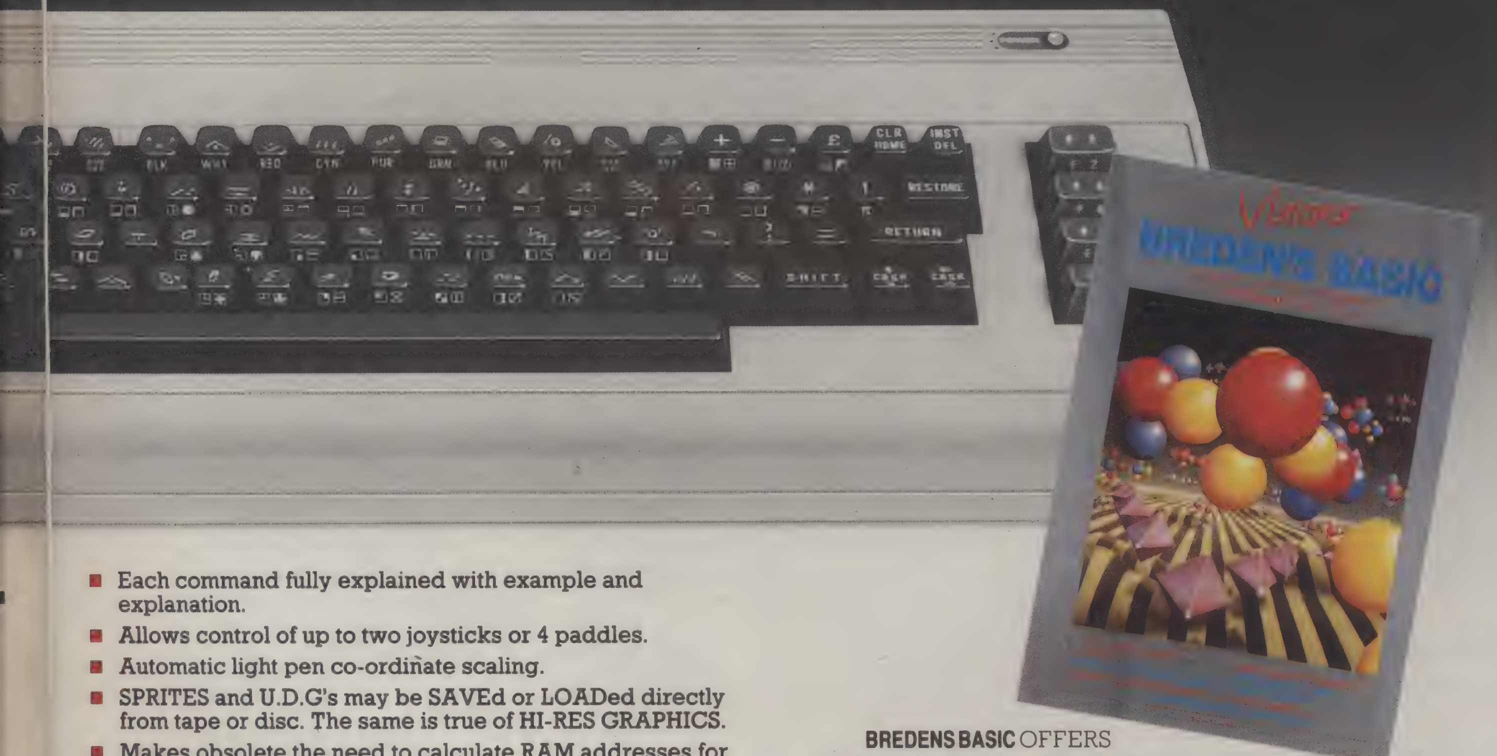
CHECKLIST

Product	Description	Age Group	Machine	Price	Company	Address
Educational Robot OGRE I	Small version of industrial robot			Kit £195 Assembled £240	LW Staines	London Road, Barking, Essex. Tel: 01-591 2900
Financial Techniques	Pre-business training — costing, budgetting, ratios, etc.	17 +	64	Cas./Disk £19.95	Hama	209 Silver Road, Norwich. Tel: 0603 400624
Planning Techniques	Forecasting, stock control, business statistics, etc.	16 +	64	Cass./Disk £19.95		
Armdroid	Small educational training robot. ROM Packs.		64	Robot £500 Cartridge £50	Colne Robotics	Beauforth Road, Twickenham, Middx. TW1 2PQ. Tel: 01-892 8197
Colne 5 CNC lathe	Lathe for training. ROM Packs.		64	Lathe £2,000 Cartridge £100		
Animated Arithmetic	Moving colour pictures	3-8	Comm. 64 VIC 20 Cass. only	Cass. £6.50 Disk £7.50	LCL	26 Avondale Avenue, Staines, Middx. Tel: 0784 58771
Micromaths	24 programs	O/level	64 & VIC	Cass.(2) £24.50		
Mastermaths	50 programs	Beginner - O/level	64	Disks(6) £90.00		
Sir Francis Drake Adventure Game	Authentic, historical adventure game	8-Adult	64	Cas. £6.50		
Identikit	Build up faces on screen (only 2 keys)	2-6	64	Cass. £7.95	Stell Software	36 Limefield Avenue, Whalley, Lancs. Tel: 025482 3432
Maths Invaders	Shoot questions with right answers	4-12	64	Cass. £7.95		
Missing Words	English words	6-11	64	Cass. £7.95		
Table Invaders	Times Table Tutor	6-11	64	Cass. £7.95		
Fun Words	English words	4-6	64	Cass. £9.95	Ampalsoft	31 Woodbridge Road, Darby Green, Blackwater, Camberley, Surrey. Tel: 0252 876677

ogramming problems?



- Each command fully explained with example and explanation.
- Allows control of up to two joysticks or 4 paddles.
- Automatic light pen co-ordinate scaling.
- SPRITES and U.D.G's may be SAVEd or LOADed directly from tape or disc. The same is true of HI-RES GRAPHICS.
- Makes obsolete the need to calculate RAM addresses for any graphic commands.
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- Less than 8K **BREDENS BASIC** allows plenty of room for program development.

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Great value for money at £39.95, a
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C.S.M. (Consolidated Software Marketing). Suite 40, Strand House,
Great West Road, Brentford, Middlesex. TW8 9EX. Telephone 01-560 4191.

CHECKLIST

Product	Description	Age Group	Machine	Price	Company	Address
4 Games For Children	Simple spelling, counting	4-10	64	Cass. £6.99	Kindersoft	P.O. Box 123, Stone, Staffs. Tel: 0782 643219
Punctuation Pete	3 levels punctuation	6 +	64	Cass. £9.95	Hill MacGibbon	92 Fleet Street, London EC4. Tel: 01-353 6482
Special Agent	Coded messages	9 +	64	Cass. £9.95		
Ballooning	Flight simulation	9 +	64	Cass. £9.95		
Car Journey	Maths (running a delivery service)	9 +	64	Cass. £9.95		
Toddler Tutor	Alphabet, numbers, matching	3-5	64	Cass. £6.95	Channel 8 Software	51 Fisher Gate, Preston, Lancs. Tel: 0772 53057
Primary Maths	Simple addition, subtraction	5-8	64	Cass. £6.95		
Maths Tutor	Multiplication, division, subtraction	8-12	64	Cass. £6.95		
Gotcha Maths	Addition, subtraction, multiplication, division	10 +	64	Cass. £6.95		
Active Computer Learning	Simple way of learning to use a computer. Certificate available at end of course.	Adult	64	Cass.(2) £7.95	Express Software	73 Watery Lane, Birmingham B9 4HN. Tel: 021-771 4711
Product Carrier's Menu Planner		16 +	64 & VIC 20	Cass. £9.95	Ivan Berg	Dunluce House, 4 Canfield Gardens, Hampstead NW6. Tel: 01-328 3341
Patrick Moore's Astronomy Program			64	Disk £12.65		
Know Your Own Personality			64 & VIC 20	Cass. £9.95		
Know Your Own I.Q.			64 & VIC 20	Cass. £9.95		
Know Your Child's I.Q.			64 & VIC 20	Cass. £9.95		
Money Manager			64 & VIC 20	Cass. £9.95 Disk £12.65		
Road User			VIC 20	Cass. £9.95		
Matchmaker (compatibility)			64 & VIC 20	Cass. £9.95		
BBS Mastermind	General knowledge & specialist subjects		64 & VIC 20	Cass. £9.95		
Quiz Master	Write & run your own quizzes		64 & VIC 20	Cass. £9.95		
BBC Ask The Family			64 & VIC 20	Cass. £9.95		
Test your Child Series	General knowledge, reading, arithmetic, spelling (2)	7-11	VIC 20	Cass. £9.95		
Revision Series	English, Maths (2), Biology, Chemistry, Physics, Geography, French, German, Computer Studies, 20th Century History	O/level	64 & VIC 20* except French, German & Computer Studies	Cass. £9.95		
Introduction To Programming Video Cassettes	Levels I & II	Reading age & above	64 & VIC 20	Cass. £19.95 each	Holiday Brothers Audio & Video Ltd.	172 Finney Lane, Heald Green, Cheadle, Cheshire. Tel: 061-437 0538/9
Get Ready to Read with BJ Bear	Pre-school Reading Skills	3-7	64	Cass./Disk £11.99	Commodore	1 Hunters Lane, Weldon, Corby, N. Hants NN17 1QX. Tel: 0536 205252
Get Ready for Numbers with BJ Bear	Pre-school Maths Skills	3-7	64	Cass./Disk £11.99		
Words, Words, Words	Vocabulary Builder	5-8	64	Cass. £11.99		
Number Puzzler	Mental Arithmetic	3-7	64	Cass. £4.99		
Facemaker	Observation Skills	5-10	64	Cass. £5.99		
Pathfinder	Spatial Orientation & Planning	5-8	64	Cass. £5.99		
Humpty Dumpty & Cock Robin	Logic and memory	7-10	64	Cass. £5.99		
Hide and Seek	Memory Skills	4-10	64	Cass. £9.99		
Adds and Subs	Maths Skills	4-6	64	Cass. £5.99		
Number Chaser	Arithmetic Estimation	7-12	64	Cass. £5.99		
Number Builder	Arcade Arithmetic	7-12	64	Cass. £5.99		
Number Learning x3	Combines: Number Chaser Number Puzzler Number Builder	7-12	64	Cass. £9.99		
GCE O/Level Revision	French, German, Computer Studies, English Language, Biology, Mathematics 1 and 2, History, Geography, Physics, Chemistry	7-8 upwards	64	Cass. £9.99 each		
Fun Mathematics on your Micro Computer	Maths Skills	7-8 upwards	64	Cass./Disk £9.99		

Learning is fun

Learning doesn't have to be dull. We gave a selection of educational packages to a panel (ranging in age from 4½ upwards) to discover their reaction to computer aided learning

TODDLER TUTOR

This program has four games covering a wide range of stimulating ideas.

Game 1 involves the Alphabet and in the first part the player can watch the Alphabet presented accompanied by the tune Twinkle Twinkle Little Star. The second and third parts involve either guessing which letter comes next, or guessing the letter missing from groups of four letters. The presentation could be made more exciting, I felt.

Game 2 involves counting toys — up to a maximum of 20.

Game 3 involves the use of the Joystick and the placing of coloured 'bricks' onto the correct part of a rainbow. My child of 4¼ enjoyed this part, although the two previous games were beyond him.

Game 4 can and was played by adults as well as children — up to 3 players. Based on the card game Snap, where a player has to pick two matching cards from a pack placed face down, this game allows each player to take turns, and keeps an individual score. An enjoyable game, this one, for everyone. Toddler Tutor costs £6.95.

Contact: Channel 8 Software, 51 Fisher Gate, Preston, Lancs. Tel: 0772 53057.

Stewart and Sammy Greene and friends

STORY MACHINE

A good game for the over 5's; it encourages the art of story-making in a simple to follow and interesting manner. Using a vocabulary of about 40 words (which can be flashed up at any time) the child — with help from an adult for younger children — can construct a short story.

The characters move to suit the verbs keyed in. Fairly silly sentences can be constructed, such as 'Bill eats the fence' and these are played out amusingly. There is an opportunity to insert the child's own name, and that of a dog and cat which give a familiar, attractive touch to the game.

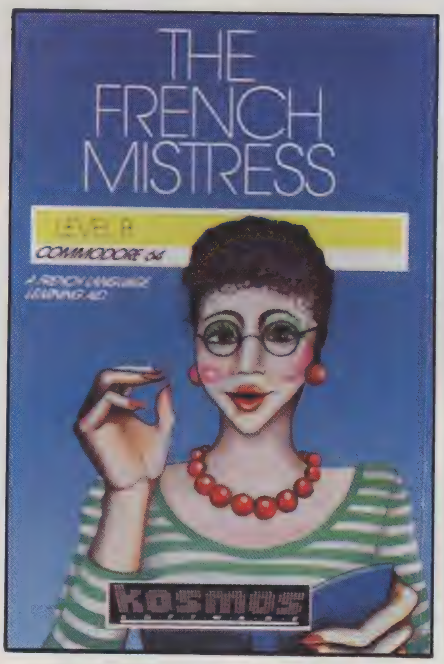
The options presented are

1. Watch a story
2. Take turns writing a story
3. Write your own story
4. Make up names for characters.

The children who tried it found Story Machine fun. Available on cassette, Story Machine costs £9.95.

Contact: Spinnaker, distributed by WHS Distributors, St Johns House, East Street, Leicester. Tel: 0533 551196.

Stewart and Sammy Greene and friends



THE FRENCH MISTRESS THE SPANISH TUTOR

One of the problems for any student of language — particularly for CSE or O Level is vocabulary. Both these packages solve this problem in a simple yet lively form. They offer English or the foreign language first. They supply related lists, eg the family, the house etc and they let the learner choose the speed of response — ideal in building in ease of use.

The O Level candidates who tried these packages with me not only improved their vocabulary quickly and significantly, but recommended this for use both in classroom with a teacher, in a language laboratory or at home as a way of making what is a necessary but repetitious task fun to do.

Younger children using them found no difficulty at all and responded with enthusiasm, treating them more as a game than a form of education and in consequence learning rapidly even if they were not yet taking the languages at school.

Within their own terms as very useful assistance to learning French and Spanish, 'The French Mistress' and 'The Spanish Tutor' are both highly recommendable for children and adults. Both are available on cassette at £8.95.

Contact: Kosmos Software, 1 Pilgrim Close, Harrington, Dunstable, Beds. Tel: 05255 3942.

Anthony Maxel

PUNCTUATION PETE

Pete, himself is a charming character jumping from word to word and waving when a passage has been punctuated correctly.

The player can choose the reading level of the passage, and also what type of punctuation he/she wants to concentrate on, ie full stops and capital letters or question marks or commas, or a passage where all the punctuation is missing.

An ideal program for O Level, CSE English Grammar students, or for any student wishing to improve his/her basic English punctuation.

On side 2 there are three more games Thesaurus, Anagrams and Hangman, all of which are self-explanatory and enjoyable. Except for the loading time — more than 10 minutes. (When will software manufactures realise that, especially in educational material, fast loading is a must to keep the attention?) this is highly recommendable for schools or homes. Punctuation Pete is available on cassette at £9.95.

Contact: Hill MacGibbon, St Bartholomew House, 92 Fleet Street, London EC4. Tel: 01-353 6482.

Stewart and Sammy Greene and friends

MACBETH

Shakespeare is everpresent in English examinations for the 15 to 18 year old age group. Yet the language, the breadth of reference and the multiple emotions make the plays difficult even for experts. There is, therefore, a permanent need for reasonably simple guides to what the plays mean and what examiners demand.

In this category, Penguin's series is a good idea if somewhat unsophisticated.

Macbeth (available on cassette at £7.95) carries three blocks of choice — the 'concepts': ambition, fear, blood etc; the characters: Macbeth etc and the scenes and acts. The package lets the user relate to one of each group and then lists the references. So you find out, for example, how many times in Act 1 Macbeth and ambition are mentioned.

This seems a fairly basic way of approaching a complex play. However, it would seem that in conjunction with other information from a teacher it could reinforce the sheer weight of remembered evidence available to anyone attempting an examination.

Contact: Penguin Books, 536 King's Road, London SW10 0UH. Tel: 01-351 2393.

Sylvester Broadwell

SAMS
Learn BASIC Programming in 14 Days on Your Commodore 64
Gil M. Schechter
COMMODORE 64
GRAPHICS
COMPENDIUM
David Durang
SAMS
Commodore 64 Starter Book
SAMS
Mostly BASIC: Applications for Your Commodore 64
Book 1
Howard Berenbon
COMMODORE 64
PROGRAMMER'S REFERENCE GUIDE
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Pocket Guide
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Commodore 64 BASIC Programs
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SERVICE DATA FOR YOUR COMPUTER
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Keyboard Skills

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Remember, supplies of this package are limited to the first 200 new members purchasing another product. So join the CCI Readers Club and send your order now.

The CCI Readers Club

Commodore 64 Starter Book *RRP £9.95, CCI Readers Club Price £7.25 (plus p&p)*
A common-sense, practical approach introduces the reader to programming and understanding the Commodore 64. Also covers accessories, computer care and choice of software. Recognised as an outstanding aid for 64 owners.

Mostly BASIC: Applications for your Commodore 64 *RRP £9.95, CCI Readers Club Price £7.25 (plus p&p)*
42 trouble-free programs for the novice whether a teacher, hobbyist, small-scale business person, gamester, home-owner or small-scale investor, offers something to save you money and give you pleasure.

Computer Facts Commodore VIC 20 Commodore 64 *RRP £14.95 each, CCI Readers Club Price £10.95 each (plus p&p)*
Comprehensive packs containing easy to use informative technical data. Each includes specific information on the individual components plus overall trouble shooting hints for keeping your 64 or VIC 20 in top condition.

I wish I knew .... about the Commodore 64 *RRP £5.95, CCI Readers Club Price £4.25 (plus p&p)*
A largely visual approach is used so parents and children can grasp basic ideas about computing and programming. No previous knowledge of computers is assumed. A must for new owners.

Learning LOGO on the Commodore 64 *RRP £5.95, CCI Readers Club Price £4.25 (plus p&p)*
A practical introduction to the exciting new advanced language LOGO — quick and easy to learn but as versatile as BASIC. The book includes many new suggestions for experimenting. Ideal for the more serious user.

PITMAN TYPING Keyboard Skills *Cassette RRP £9.95, CCI Readers Club Price £7.25 (plus p&p) — Disk RRP £14.95, CCI Readers Club Price £11.25 (plus p&p)*
An original, flexible keyboard course teaches beginners to type with speed and efficiency; provides basic skills for typing, specialised figurework or data processing. Ideal, too, as a refresher course or simply to improve speeds.

Commodore 64 GRAPHICS Compendium *RRP £5.95, CCI Readers Club Price £4.25 (plus p&p)*
A complete user-graphics package containing a large library of pre-defined graphic characters and easy-to-use programs enables you to produce your own games programs and special effects.

Pocket Guide Commodore 64 *RRP £2.50, CCI Readers Club Price £1.85 (plus p&p)*
For those with no programming experience, this handy reference guide provides vital descriptions of the salient features of the C64, and a lead-in to the BASIC language.

Commodore 64 Programmers Reference Guide *RRP £13.95, CCI Readers Club Price £7.95 (plus p&p)*
All you need to know about the 64; everything from graphics & sound to advanced machine language. A must for all 64 owners.

from your Commodore

Commodore 64 Basic Programs (second edition) *RRP £8.95, Lucky 200 Price £2.95 (plus p&p)*
30 ready-to-run programs for experiment and entertainment in education, games, graphics, personal, sound, utilities. A perfect collection for the interested user.

Commodore 64 Trivia Data Base *RRP £18.50, CCI Readers Club Price £13.85 (plus p&p)*
Introducing data bases and their application for fun and education; enables users to understand how a simplified data base is created and why it works and how to use it. A key publication for the serious user.

The Tool Kit Series Commodore 64 Edition *RRP £5.95, CCI Readers Club Price £4.25 (plus p&p)*
The "tools" are short 5 to 15 line subroutines that combine colour, sound and graphics to form a variety of educational programs and computer games. An exceptional 'tool' for getting the best out of your 64.

Learn BASIC Programming in 14 Days on your Commodore 64 *RRP £7.95, CCI Readers Club Price £5.75 (plus p&p)*
An easy to understand course for beginners aged 13+ with explanations of entering and editing programs, printing, loops and arrays, data storage, creating sound and music, colour, animation and designing graphics. A must for all new 64 users.

To: Commodore Computing International, Finsbury Business Centre,
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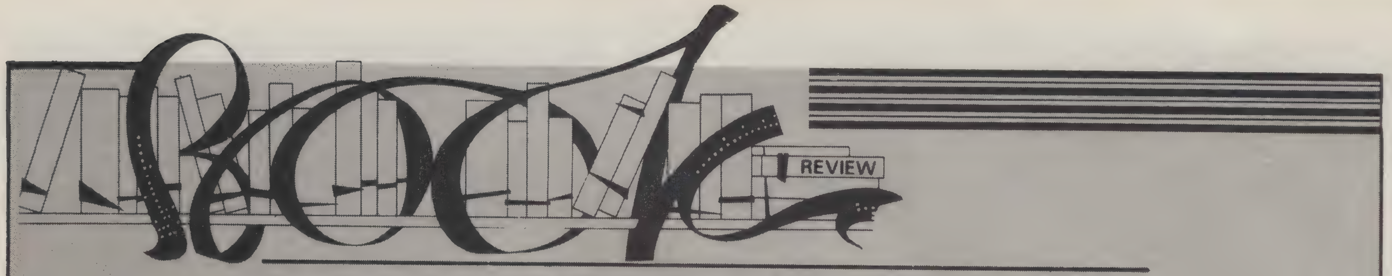

Computer journalist Peter Arnott-Job evaluates a selection of newly-released computer books.

THE EASY GUIDE TO YOUR COMMODORE 64, by Joseph Kascmer — £6.95

Most reviewers must surely be running out of things to say about books that introduce the beginner to a computer. The Easy Guide to Your Commodore 64 is one of the better efforts but even so it's difficult to get over-excited about. It's really an expanded, more understandable version of the 64's notoriously poor manual.

Rather than investing in a book which claims to teach all you need to know about the Commodore 64 and to take you from beginner to advanced programmer in 200 pages and two weeks, you'd be much better off buying a book like this to start off with.

The book is American, of course, and that means that some of the programs will not be directly relevant to many of Commodore Computing International's readers outside the USA. However, it only takes a little common sense to adapt the programs to suit your own country. The details of tax systems, pension arrangements and the buying and selling of property might be different but the principles are basically the same all over the world. Even so it's a shame that publishers don't try harder to meet the demands of the international market.

Commodore 64 Basic Programs in Minutes is by no means a major culprit in this respect. It's usefulness probably outweighs disadvantages caused by its failure to travel well. If you're a small businessman or self-employed, own a Commodore 64 and want to learn more about programming while producing something useful this is well worth looking at. But don't expect to produce marvellous business software overnight. And, as the author himself warns, don't expect a Basic teaching manual. You'll undoubtedly learn a lot about programming as a by product but the book is not intended to be a tutor.

Contact: Sybex Computer Books, Unit 4, Bourne Industrial Estate, Bourne Road, Crayford, Kent.

COMMODORE 64 BASIC PROGRAMS IN MINUTES, by Stanley R Trost — £8.95

Commodore 64 Basic Programs in Minutes is a useful book that's basically a library of small programs. These programs average something like 20 lines but that doesn't mean to say they're not useful. Many of the programs are really subroutines and will eventually build into a much bigger program. The chapter headings sum up the sort of programs contained in the book: Home and Business Finance, Useful Business Programs, Real Estate Programs, Data Analysis Programs, Record Keeping Programs and Mathematics Practice Programs.

THE GUIDE TO COMMODORE 64 SOFTWARE, by John Darling — £5.95

In The Guide To Commodore 64 Software, author John Darling examines something like 250 pieces of software. It's a book which, though useful, has inevitable drawbacks. First of all, as John Darling himself admits, the software scene is constantly changing and a book like this is bound to be out of date soon after it's published. However, he seems to have stuck to the better software, the sort of stuff that's likely to last some time. In the circumstances this book does an excellent job.

The second, perhaps more serious drawback, may also be inevitable. The assessments of the software read as if they were written by the software houses themselves and then rewritten by the author. He makes no attempt at an accurate assessment of the software but rather gives a more or less straightforward description of each product. The problems of assessing software are enormous. The best way of doing it is by using the software over a reasonable period. John Darling may well have used all the software himself but anyone who has used some of the more advanced business software knows that discovering all the good and bad points can take a good few weeks of fairly heavy use. I don't particularly blame John Darling from avoiding the attempt to produce objective assessments but personal comments and recommendations would have been invaluable.

In spite of its drawbacks The Guide to Commodore Software will undoubtedly prove useful. Especially for anyone receiving a 64 as a present and who's looking around for suitable software.

Contact: Granada Technical Books, Granada Books, 8 Grafton Street, London W1X 3LA.

CHILDREN'S BOOKS

The following three books take the score so far to Kids Books 3/Adult Books 3. Or, on another level USA Books 5/Rest of the World Books 1.

The figures are not an accident. They really do reflect the situation — children's books are a very important market and the computer book publishing scene, especially as far as Commodore machines are concerned, is dominated by America. (Homework Helper is not, strictly speaking, a children's book. It's a book which helps adults write programs that will help their children so it is aimed at the children's market.)

All three are from the USA but they have one other thing in common — they are excellent. They are better than most of the books that come into this office in almost every respect. It seems odd doesn't it that computer books for children in general are better than other books although there are the inevitable odd few that let the side down.

You've read some strong words on the book review pages of Commodore Computing International about the consistently pathetic production standards in computer publishing. Keying in programs from a book full of programs which you're told to key in so often means destroying the book. Half a pound of indestructible glue has been used to reinforce the spine and there's no way that the book can be opened flat without breaking the spine in at least half a dozen places. Publishers who produce such books are either stupid or they don't give a damn about their readers.

it's therefore refreshing to find three books in one batch that have spiral binding. All such books ought to have spiral binding. Computer book buyers pay enough to deserve better treatment.

The three books are well put together and it's obvious that a great deal of thought has gone into each one. They have been carefully planned and are therefore logically structured, very important when you're dealing with children or talking to those who deal with children.

Book REVIEW

HOMEWORK HELPER: USEFUL PROGRAMS FOR COMMODORE COMPUTERS, by Michael Ports with Herb Kohl — £6.75

Homework Helper is a difficult book to review because this reviewer found it intensely irritating. Everything about it is excellent except for the style of writing. It's nice and chatty and friendly but, oh dear, it's also so patronising. The author talks to you as if you're a child using lots of phrases like: 'Are you with me?' and 'As I was saying'. This beginning to a chapter called Mathfax (why must computerates pervert the English language so much?) is typical: '"Two and two are four; four and four are eight..." The mathematical facts of life are never easy and everyone has a pet bugaboo (for me, it's eight times seven.)' You know what you can do with your bugaboo!

If you don't find that sort of language irritating — and I can only suppose that most Americans don't — then you will find this a very useful book. Although it's intended to help parents or teachers with their kids' education it should also teach the adults a great deal about computers.

Contact: Prentice Hall International, 66 Wood Lane End, Hemel Hempstead, Herts.

BASIC IS CHILD'S PLAY, by Judy Gordon and Marsha Schemel — £16.95

Basic is Child's Play does a very different job. Being American it explains that it's aimed at elementary school children. In Britain that means primary school children. The child will probably have been reading for a couple of years and that probably means a minimum age of around seven years. The clear, uncluttered layout and its traditional approach make it very easy to understand. There are no clever tricks to distract the child, apart from a couple of cartoon characters which are not too obtrusive.

As far as the UK market is concerned Americanisations will prove to be irritating. No kid outside America will know what on earth is going on when the authors start talking about the Pledge of Allegiance and Stars and Stripes. There's also bound to be confusion about "$". What does it mean? String or Dollar? "Is the dollar a variable too, daddy?" Apart from these inevitable faults it's an excellent book which won't sell too many copies. At £16.45 who would be surprised?

Contact: Sybex Computer Books, Unit 4, Bourne Industrial Estate, Bourne Road, Crayford, Kent.

POWER UP! KIDS' GUIDE TO THE COMMODORE 64, by Marty DeJoghe and Caroline Earhart — £7.95

Power Up! is also the obvious result of a great deal of thought. It's aimed at the same market as Basic is Child's Play but there are two major differences. First of all it is just a little bit cluttered. The bright, flashy layout might well appeal to kids but it might also distract and confuse them from time to time. This is not a serious fault and it wouldn't stop me from buying it. The other major difference is the price. At £7.95 Power Up! is less than half the price of Basic is Child's Play. The price difference does not reflect a huge difference in quality.

Contact: Sybex, Unit 4, Bourne Industrial Park, Bourne Road, Crayford, Kent.

The written word on C16 and Plus/4

The coming of the New Year brings with it the first books for the C16 and Plus/4

Shiva Publishing, 64 Welsh Row, Nantwich, Cheshire.
Tel: 0270 629 440
- C16 Easy Programming £5.95
- Gateway to computing with the C16 — Books 1 & 2 — £4.95 each
- Introduction to C16 Machine Code — £6.95 (due in Feb)
- Commodore Plus/4 Machine Code — £6.95 (due in Feb)
- The Commodore 16/Plus 4 Companion — £5.95
- The Commodore Plus 4 Disk Companion — £7.95 (due in Feb)
- Commodore Plus 4 Adventures — £5.95
- Computer Simulations on your Commodore Plus 4 — £6.95
- The Working Commodore Plus 4 — £6.95

Bernard Babani, Tel: 01-603 2581
- Introduction to Programming the C16 and Plus/4 — £2.50 (due in March)

Sunshine Books, 12-13 Little Newport Street, London WC2.
Tel: 01-437 4343
- The Working Commodore C16 — £6.95

Melbourne House, Castle Yard House, Castle Yard, Richard, Surrey.
Tel: 01-940 6064
- C16 Games Book
- Commodore 16 Exposed
- Commodore 16 Machine Language for the Absolute Beginner
- Commodore 16 Sound and Graphics
- 6502 Reference Guide

C16 & Plus/4 Software Checklist

Many software companies are following the release of Commodore's C16 and Plus/4 machines with releases of new utility and games software. Because the operating systems are the same in both machines, any software for the C16 also can be used on the Plus/4. But the converse is not true since the Plus/4 has a larger memory, so its software may not fit into the C16's memory.

The following is a list of offerings — all compatible with both the C16 and the Plus/4 — for those of you eager to get the most out of your new acquisition.

COMMODORE UK, 1 Hunters Lane, Weldon, Corby N. Hants NN17 1QX. Tel: 0536 205252.

Cassette based:		
Mayhem	Arcade	£ 5.99
Harbor Attack	Arcade	£ 5.99
Stellar War/Blitz	Arcade	£ 5.99
Crazy Golf	Arcade	£ 5.99
Sand Castle/Paramaths	Educational	£ 5.99
UXB	Arcade	£ 5.99
Space Sweep	Arcade	£ 5.99
Cartridge based:		
Jack Attack	Arcade	£14.99
Pirate Adventure	Adventure	£11.99
Atomic Mission	Text adventure	£11.99
Strange Odyssey	Text adventure	£11.99
Viduzzles	Educational	£11.99

Included in C16 starter pack: Introduction to Basic; Picture Builder, XZAP, Punchy and Starter Chess on one cassette. Coming soon from Commodore: A games creator program.

SUPERSOFT, Winchester House, Canning Road, Harrow HA3 7SJ. Tel: 01-861 1166.

Mikro Assembler	Editor/assembler	£12.95 cassette, £14.95 disk
Graphics Designer	Character Editor	£ 9.95 disk
Kaktus	Arcade game	£3.95 cassette
Music Master	Music composer/synthesiser	£12.95 cassette, £14.95 disk
The Chip Factory	Arcade game	£ 5.95 cassette

(At the time of going to press, Supersoft had not finalised prices and the above should be taken as an indication only.) Coming soon from Supersoft: Suite 16 — a spreadsheet and word processor.

ANIROG SOFTWARE LTD, Unit 10, Victoria Industrial Park, Victoria Road, Dartford, Kent. Tel: 0322 92513/8.

Skramble	Arcade	£ 6.95 cassette
Moon Buggy	Arcade	£ 6.95 cassette
3D Time Trek	Arcade	£ 6.95 cassette
Flight Path 737	Arcade	£ 6.95 cassette
Zodiac	Arcade	£ 6.95 cassette
Las Vegas	Arcade	£ 6.95 cassette

MR CHIP SOFTWARE, 9 Caroline Road, Llandudno, Gwynedd LL30 2TY. Tel: 0492 79026.

Pacmania	Arcade	£ 7.50 cassette
Olympic Skier	Arcade sport	£ 5.99 cassette

(At the time of going to press, Mr Chip Software had not finalised prices and the above should be taken as an indication only.)

ROMIK Software, 272 Argyll Avenue, Slough, Berks. Tel: 75 71535.

Pottit	Sports simulation	£ 6.99 cassette

ZETA SERVICES, Harden Park, Alderley Edge, Cheshire SK9 7QN. Tel: 0625 583850.

Cassette deck with C16-Plus/4 adaptor	£29.95
Joystick interface	£ 3.95

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Programmers Reference Guide (Commodore) Book	£9.95
Dr Watson Basic Course (Honeyfold)t.	£10.50
Dr Watson Assembly Course (Honeyfold)t.	£12.50
Mastercode Assembler (Sunshine)t.	£14.95
Assembler Development Pack (Commodore)d.	£28.95
MON 64 (Handic)r.	£37.95
Programmers Utilities (Commodore)d.	£14.99
CPM (Commodore)r&d.	£49.95
FORTH (Audiogenic)r.	£29.95
LOGO (Commodore)d.	£34.95
PILOT (Commodore)d.	£24.95
Simons Basic (Commodore)r.	£44.95
Petspeed 64 Basic Compiler (Commodore)d.	£44.95
Jetpack Basic Compiler (Dataview)t/d.	£14.95/£29.95
Scope 64 (I.S.P.)t/d.	£17.95/£18.95
Micro Magpie (Audiogenic)d.	£39.95
Superbase 64 (Precision)d.	£87.95
Calc Result Easy (Handic)r.	£44.95
Calc Result Advanced (Handic)r&d.	£89.95
Micro Swift (Audiogenic)t/d.	£19.95
Easy Spell (Commodore)d.	£44.95
Easy Stock (Commodore)d.	£66.00
Cashbook & VAT Accounts (Gemini)t/d.	£59.95/£64.95
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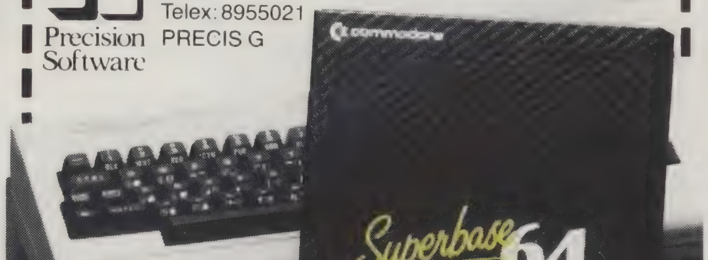
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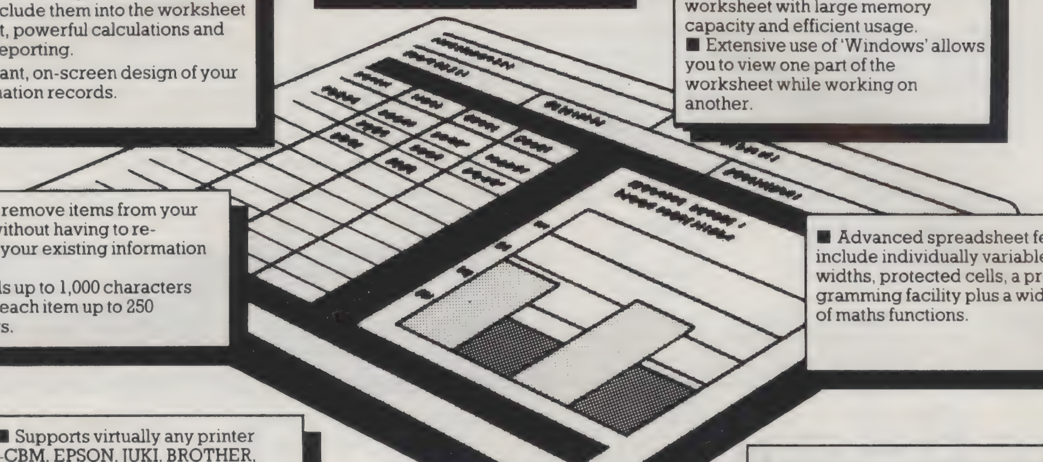

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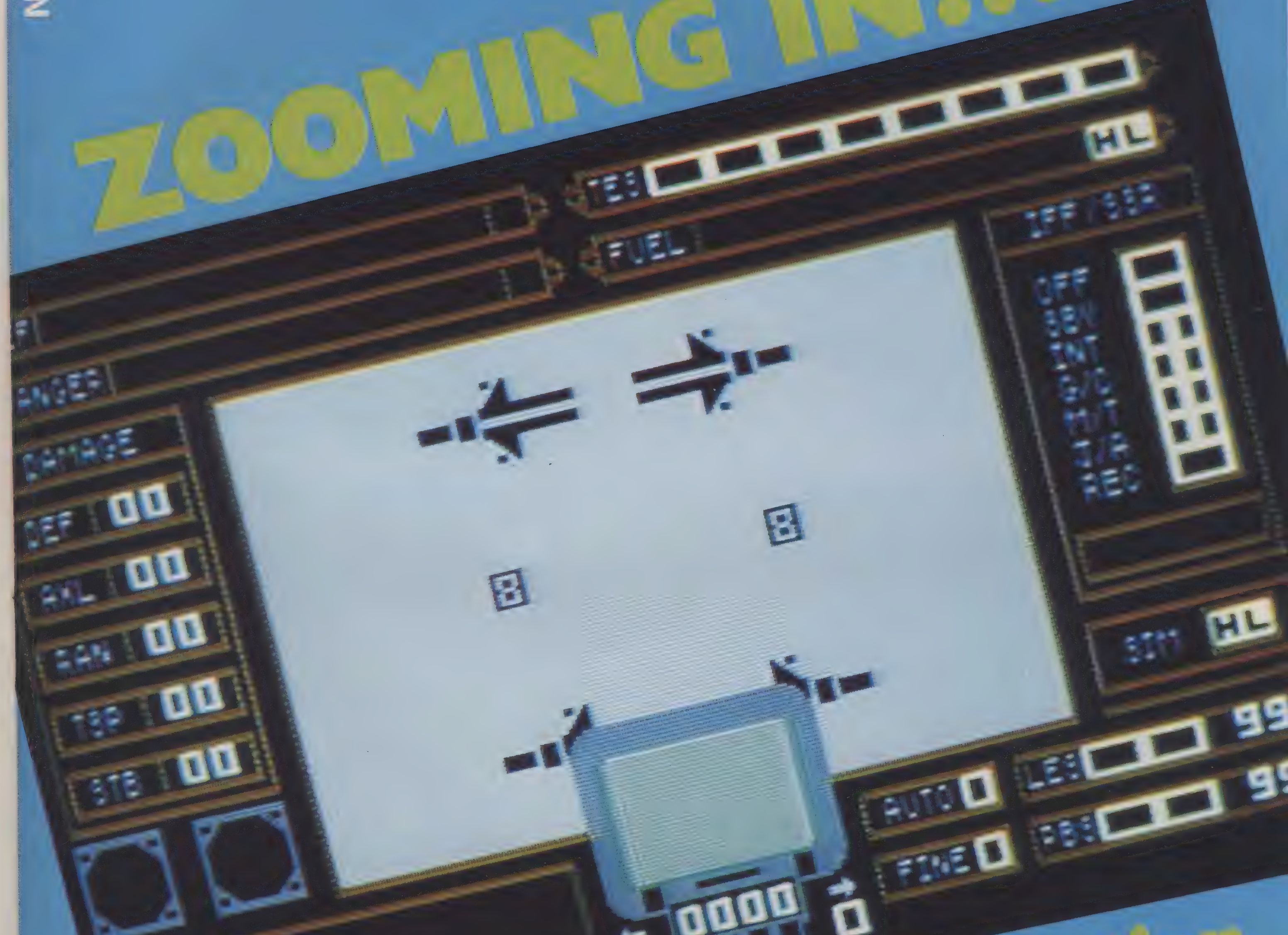
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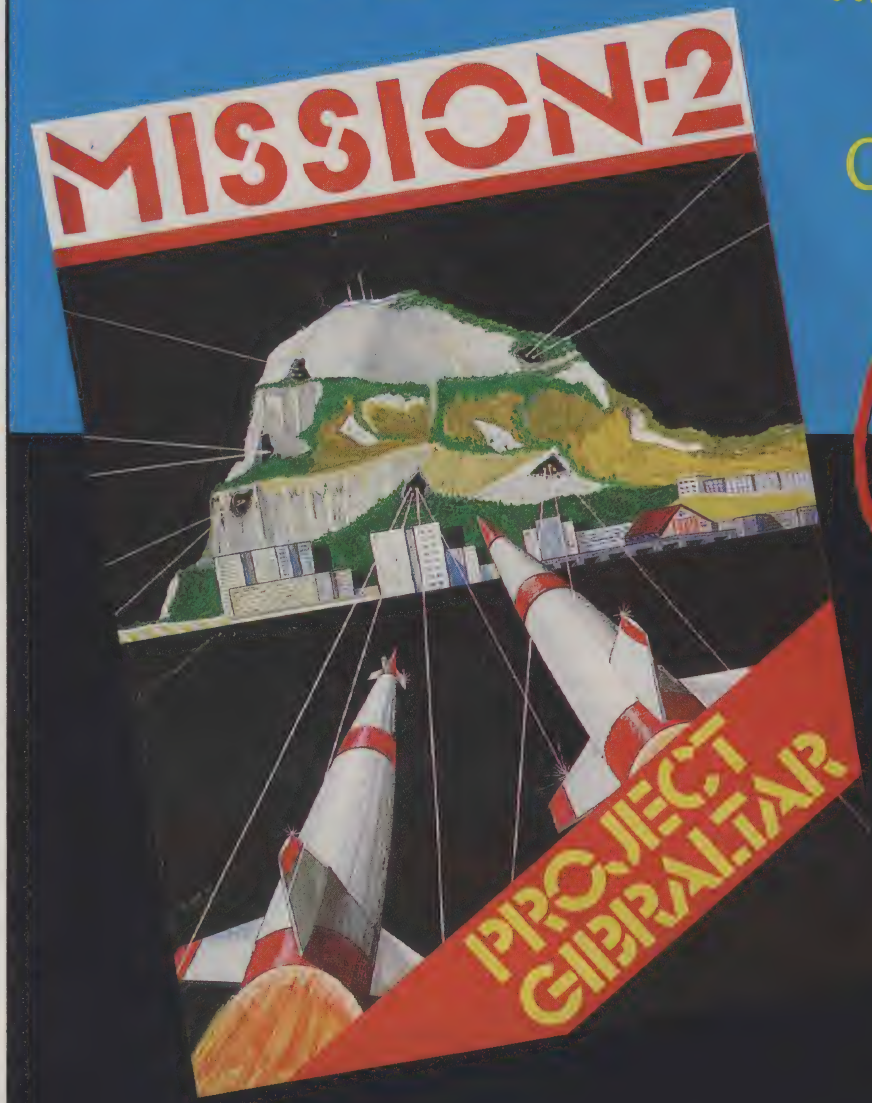

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More reviews; CCI panel announced

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Macbeth leads the charge

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Adventurer international, Scott Adams

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A look ahead from industry leaders

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Win dozens of disks and a disk camera

New games releases

ARCADE

Agent USA, (£7.95 cassette, £14.95 disk), released by Longman Software, Longman House, Burnt Mill, Harlow, Essex. Tel: 0279 26721

In 1985, (£4.99 cassette), released by Phoenix Software, Spangles House, 116 Marsh Road, Pinner, Middlesex. Tel: 01-868 3353

Henry's House and **Witchswitch**, (£8.95 each cassette), released by English Software, Box 43, Manchester M60 3AD. Tel: 061-835 1358

Frantic Freddie, (£8.95 cassette, £12.95 disk), released by Audiogenic, PO Box 88, Reading, Berks RG6 1AZ. Tel: 0734 664646

The Thinker, (£1.99 cassette), released by Atlantis Software, 19 Prebend Street, London N1 8PF. Tel: 01-354 1437

Invaders 64, (£6.50 cassette, £8.50 disk), and **Invaders VIC 20**, (£4.90 cassette), released by Live Wire Software, Progress House, 31/33 Mount Street, Salford M3 6LQ. Tel: 061-834 4233/4519

Perils of Bear George, (£6.95 cassette), released by Cheetah-Soft Ltd, 24 Ray Street, London EC1R 3DJ. Tel: 01-833 4733

Black Thunder, (£7.95 cassette, £12.95 disk), released by **Quicksilva**, Palmerston Park House, 13 Palmerston Road, Southampton, Hants. Tel: 0703 26515

Blue Max, (£9.95 cassette or disk), released by US Gold, Unit 10, Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Tel: 021-359 3020

Quinx, (£6.95 cassette, £8.95 disk), released by Supersoft Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. Tel: 01-861 1166

Combat Lynx, (£8.95 cassette), battle simulation released by Durell Software, Castle Lodge, Castle Green, Taunton, Somerset TA1 4AB. Tel: 0823 54489

Juice and **Suicide Strike**, (£7.95 cassette), released by System 3 Software, Southbank House, Black Prince Road, London SE1. Tel: 01-582 7522

Big Ben, (£7 cassette), released by Interceptor Micro's, Lindon House, The Green, Tadley, Hampshire. Tel: 07356 71145/3711.

ADVENTURE

Spiderman, (£9.95 cassette), graphic adventure released by Adventure International, 119 John Bright Street, Birmingham B1 1BE. Tel: 021-643 5102

Swords and Sorcery, (£9.95 cassette), graphic adventure released by PSS, 452 Stoney Stanton Road, Coventry CV6 5DG. Tel: 0203 667556

Salvage 64, (£6.50 cassette, £8.50 disk), graphic adventure released by Live Wire Software, Progress House, 31/33 Mount Street, Salford M3 6LQ. Tel: 061-834 4233/4519

Tristan and Isolde, (£8.95 cassette), graphic adventure released by CRL Group, CRL House, 9 Kings Yard, Carpenter's Road, London E15 2HD. Tel: 01-533 2918

Counts Castle, (£5.95 cassette), graphic arcade adventure, and **Hurrah Henry**, (£6.95 cassette), 3D adventure also for the C16 and Plus/4, both released by Mirage Software and Distributors, 9 Rossini Street, Seaforth, Liverpool L21 4NS. Tel: 051-920 9713

Time Traveller and **Magic Stone**, (£5.95 each cassette), both graphic adventures; also **Alice in Videoland**, now on cassette, (£8.95 cassette, £12.95 disk); all released by Audiogenic Ltd, 39 Suttons Industrial Park, London Road, Reading, Berks RG6 1AZ. Tel: 0734 664646

Upper Gumtree, (cassette), graphic adventure released by Richard Shepherd Software, Elm House, 23-25 Elmshott Lane, Cippenham, Slough, Berks. Tel: 06286 67148

Soldier of Fortune, (£7.95 cassette), arcade adventure written by Psychic Engineering Control Group for English Software, Box 43, Manchester M60 3AD. Tel: 061-835 1358

The Wrath of Magra, (£12.50 for two cassettes and paperback book), Se-Kaa of Assiah, (£2.99 cassette), and **Black Crystal**, (£3.99 cassette), both graphics adventures released by Mastertronic Ltd, Park Lorne, 111 Park Road, London NW8 7JL. Tel: 01-402 3316

My First Adventure, (£5.95 cassette, £9.95 disk), released by Jolly Rogers Software, 19 Castleton Avenue, Barnehurst, Bexleyheath, Kent DA7 6QT. Tel: 0322 332889

Interview, Dead City Rescue and **White Viper**, (£7.95 cassette, £9.95 disk), graphic adventures released by Front Runner Software, 620 Western Avenue, London W3 0TU. Tel: 01-992 8055

Choplifter, Lode Runner, Spelunker, David's Midnight Magic, Raid on Bungeling Bay, Hard Hat Mack, One On One and **Realm of Impossibility**, (£9.95 cassette, £12.95 disk), and **Operation Whirlwind, Murder On The Zinderneuf, Archon** and **M.U.L.E.**, (£11.95 cassette, £14.95 disk), all released by Ariolasoft, Asphelte House, Palace Street, London SW1. Tel: 01-834 8507

SPORT

Hyper Biker, (£7.95 cassette), released by PSS, 452 Stoney Stanton Road, Coventry CV6 5DG. Tel: 0203 667556/81346

Motocross, £7.95 cassette), released by System 3 Software, Southbank House, Black Prince Road, London SE1. Tel: 01-582 7522

Match Point, (£7.95 cassette), tennis simulation released by Psion Ltd, 22 Dorset Square, London NW1 6QG. Tel: 01-723 9408/6919.

Attention software companies: If you would like your Commodore games included in our list, please send complete information as soon as possible.

THREE FROM SYSTEM 3

A frustrated android, a suicidal pilot and a computer biker could be guests at an asylum. Actually they are the subjects of three new games from America imported to the UK by System 3 Software.

In Juice, Edison the kinetic android is trying to build a circuit board but is constantly being interrupted by harmless but annoying Nohms, the sneaky Killerwatt and, of course, Flash the lightning bolt.

The pilot in Suicide Strike must attempt to destroy a major military post no matter what the cost, including his life. other less disturbing dangers include getting "your tail shot off" – the tail of the jet, we should hope.

Motocross is a realistic simulation of what it's like to zoom over a motorcycle track with the speedometer, fuel gauge, temperature gauge and rev counter reflecting the moves the player makes. Of the three difficulty levels, number two includes a starter, a timer and five lap courses.

Each of the three games is available on cassette and retails for £7.95.

Contact: System 3 Software Ltd, Southbank House, Black Prince Road, London SE1. Tel: 01-587 0873.

FINAL RELEASE IN HARE HUNT

Fanatic followers of the £30,000 hunt for the golden jewelled hare can now get the final game installment in the series, Hareraiser-Finale.

Since Haresoft brought out the competition puzzle-computer game combination, groups of friends and colleagues have banded together to solve the puzzle with the clues and graphics on the game. The company says schools also have ordered the game to help teach computer logic skills.

Cont. on page 31

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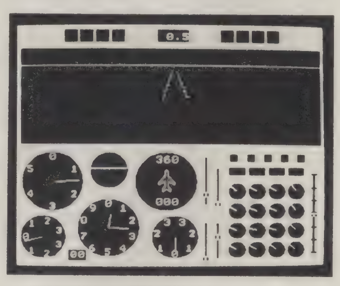

picture shows BBC/B version (2 colour)

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The Jewelled Hare of Masquerade is a famed piece of jewellery and the player who solves all the puzzles and riddles involved in the game must decide whether he or she will keep the treasure or take Haresoft's offer of £30,000 in exchange. The company says, when the jewel first was buried by Kit Williams and Bamber Gascoigne in 1979 its value was listed at £5,000.

Contact: Action Media Ltd, 57 Hanover Gardens, London SE11 5TN. Tel: 01-582 8080.

64 FULL UP

Mines, machine guns, strafing rockets and a Lynx helicopter are just a few of the ingredients that help fill all 64K of memory with a new game from Durell Software for the C64.

Combat Lynx features 3D graphics including an intelligence map on screen which gives a picture of the area in relief. The player, working in real time, flies a Lynx helicopter with a mission to support the ground forces and protect the bases.

Durell engaged the assistance of Westland Helicopters to put together the battle simulation, which can be played with keyboard or one or two joysticks.

Available on cassette, Combat Lynx costs £8.95.

Contact: Durell Software, Castle Lodge, Castle Green, Taunton, Somerset TA1 4AB. Tel: 0823 54489.

FRANKIE GOES TO OCEAN

Frankie Goes To Hollywood will make its debut next spring on a new kind of keyboard – new to the group, that is.

Ocean Software has arranged a contract which will produce the first Frankie computer game with the cooperation of Island recording company and the group's creative producers Zang Tumb Tuum (ZTT). The three companies will share copyright privileges as well as profits. The band also will get royalties from the game, being written for the 64.

"We are considering the possibility of producing the game on other machine formats and looking at worldwide sales through tie-ups with hardware manufacturers," says James Bradley of Island Records. "A record company's marketing strategy does not stop at albums and singles. Today there is a wealth of opportunity in ancillary products providing we deal with reputable companies."

Ocean, which apparently has been working on the game for some time, promises its release "early in the Spring of 1985," with a recommended retail price of £9.95.

FAR EAST SHOPS SELL FAKE GAMES

Quicksilva is chasing software pirates all the way to Singapore.

Rod Cousens and Mark Eyles recently attended the Per Comp Asia '84 Exhibition in Singapore, but when they arrived they found that quite a few of their C64 games had preceded them – without the proper visas, you might say. Apparently several shops there had been selling pirated software and some Quicksilva enthusiasts promptly revealed the names and addresses of the shops.

A short time later, an article appeared in "The Straits Times", the Singapore daily newspaper that had found the claims to be true. Quicksilva says the matter is "being vigorously pursued".

LOW PRICES SELLING HIGH

Mastertronic, the cut-price computer games company, has sold its millionth game since its launch last April.

The success of its £1.99 games line has allowed Mastertronic to consider export as a major expansion possibility, and the company has now set up shop in Van Nuys, California, with a launch of 10 initial titles at a disk price of £8.99 each (about £7). Prices of software are considerably higher in the US and Mastertronic hopes to take advantage by selling its goal of 750,000 units over the next year. The company also has moved into nine other countries.

Mastertronic is following its current line with a new label, Master Adventurer, designed to produce adventure programs at prices of £2.99 and £3.99. But to introduce the new line is The Wrath of Magra at a cost of £12.50, which includes a library case and a 158 page paperback. The two cassettes combine for 120K of content.

Among the first budget releases are Se-Kaa Of Assiah, a game originally intended for the Mastervision label last September but now selling for £2.99 on the C64. The player is Se-Kaa, assigned "to liberate the world from the influence of a mutant race known as the Dark Hordes and reinstate the Wise Ones who ruled in former, happier times".

Other new adventures for the 64 include Black Crystal at £3.99.

Contact: Mastertronic Ltd, Park Lorne, 111 Park Road, London NW8 7JL. Tel: 01-402 3316.

THE FIRST STEP

For those not quite up to the complex word games presented in most computer adventures, new company Jolly Rogers Software has released My First Adventure.

Initially available for the C64, My First Adventure has the player roaming the countryside meeting and helping nursery rhyme characters along the way. The game permits no abbreviations, forcing young children to spell words out completely, and any relevant objects are clearly shown on the screen rather than hidden as they often are.

My First Adventure, which sells for £5.95 on cassette and £9.95 on disk, uses vivid sound as well as graphic effects such as a horn blowing or a wheelbarrow being dropped.

Contact: Jolly Rogers Software, 19 Casteleton Avenue, Barnehurst, Bexleyheath, Kent DA7 6QT. Tel: 0322 332889.

"64 to Ground Control"

Ever felt the urge to enter a cockpit and fly away from it all? Sue Pearce dons flying helmet and goggles to experience some of flight simulator programs zooming onto the software market

Many of us at some stage in life have longed to take over the controls and experience the exhilerating feeling of flying a plane. Or even to take on the personality of the Red Baron in annihiliating enemy bombers. The more ambitious have probably dreamt of conquering space in a shuttle.

Well now it's all possible without endangering your life — without even leaving your living room in fact. Flight simulators for home computers are appearing in all shapes and sizes: from those based on the real thing to others designed simply to offer the thrills of flying.

A friend of mine had the opportunity to sit in the cockpit of a real flight simulator in his childhood. Although he was too small to actually reach all the controls, it was an experience he has never forgotten.

Some of the better flight simulator programs have actually been written by pilots and are therefore technically correct. On the whole they are not games and should not be mistaken for such. Unlike the majority of games, you can't just pick up the joystick and go. Flight terminology must be learnt, along with the function and operation of each control.

You must know what speed is required for a successful take off or landing, when to raise or lower your flaps, ailerons (see what I mean!), etc.

It's no coincidence that these programs come complete with lengthy instruction leaflets or, in some cases, manuals.

I have this sneaky feeling that one of the reasons that flight simulators take so long to load is to enable you to study these instructions in great depth!

Here we have looked at eight cassette-based flight simulator programs available for the 64. Two we were unable to include, but which are worth investigating are Sublogic's Flight Simulator 2 (said to be THE flight simulator) and Omega Run from CRL.

If you're not prepared to spend time learning flight procedures, go for the programs which simply offer a taste of flying experience. But who knows? One day you may be able to take over the controls of an unexpectedly pilotless plane and guide it to safety!

747 FLIGHT SIMULATOR

You are in command of a Jumbo-jet, with the pilot's view and realistic flight deck instrument panels. Your task is to take off from Heathrow and land at any one of seven choices of airport.

A 14-page manual guides you quite clearly through the instruments and other essential information for a successful flight. Control is via the keyboard with the optional use of a joystick. (Using a joystick is more fun.)

3D graphics are interesting and the steady drone of the engine interspersed with audible alarms help set the atmosphere.

As with all flight simulators, take-off is easier than landing. Thankfully a pause facility is incorporated (as in most flight simulators) which gives you a chance to search desperately through the manual to check which flap setting you should choose when flying at below 230 knotts!

Contact: DACC, 23 Waverley Road, Hindly, Wigan, Lancs. Tel: 0942 57872.

This review was sent to us by a reader

HEATHROW AIR TRAFFIC CONTROL

An air traffic controllers work is not easy, as practice with this simulation will show. Your task is to land ten planes (or more) in thirty minutes. This can be in normal or twice normal speeds.

Your aids consist of a communications channel with all planes in your area, Heathrow, on screen representation of aircrats' height, location, speed and direction. Along with this you are given details of all aircraft wanting to land.

There are seven levels of play, from landing light aircraft to five types of aircraft, each with different speed and rate of ascent/descent. On the highest level you are concerned with spacing the aircraft away from each other, correcting speed, using the independent landing system, avoiding outgoing aircraft at varying heights, equipment failures and emergency landing procedures.

The hi-res display of aircraft locations and runways is good and cannot be faulted. The sound however is somewhat basic, but what does an air traffic controller expect.

After the thirty minute period is up you are given an assessment of your performance with details of where you went wrong, or right. You then have the option of playing again or continuing with your previous session for another thirty minutes.

The cassette loaded quite quickly for a non turbo, and on loading you are given a menu of levels from which you can select a demonstration, or it will default to a this after a preset time. All in all this is a realistic simulation and for the price should provide hours of enjoyment.

Company: Hewson Consultants Ltd., Hewson House, 56B Milton Trading Estate, Milton, Abingdon, Oxon. OX14 4RX. Tel: 0235-832939

Reviewer: R J Penfold of Bitterne, Southampton

FLIGHT PATH 737

Also available on the VIC 20 (and doing very well) Flight Path 737 has you sitting in the cockpit of a 737 sitting on the runway ready to take off. Well, almost ready. First you must line your plane up on the correct heading.

Different skill levels are available ranging from First Solo to Test Pilot.

An instrument panel shows essentials such as altitude, airspeed, aircraft heading and flap indicators.

Graphics include control instrumentation and a more interesting pilot's view than some other flight simulators. Here you actually have mountains to take into consideration instead of straightforward green is land, blue is sea.

More of a game than some others, Flight Path 737 often pulls you up on your mistakes quite sharply, in that you often get an error message as soon as you do something wrong and have to start back from the beginning. Good fun though.

Contact: Anirog, 29 West Hill, Dartford, Kent. Tel: 0322 92513.

The Chart Topping Flight Simulation Now On CBM 64.

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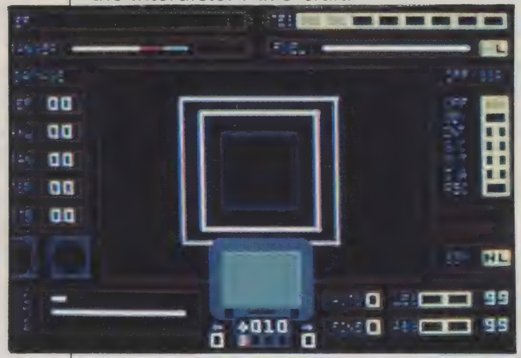
GU15 3AJ

INTERDICTOR PILOT

This one's a bit different. Set in the year 2131 with space travel commonplace, a project codenamed Interdictor Pilot is set up to counter the high percentage of pilot recruits lost during training. You now have the opportunity to undergo training to fly the Interdictor Mk 3 craft.



A 50-page Federal Inter Starbase Patrol Force pilot's instruction manual sets you on your way with helpful tips such as "buzzing a Federation freighter invites a hostile reaction".

After keying in your initials and surname, you are given a rank and grade and assigned to a craft. You then have a choice of various sorties.

Once aboard your craft, little touches like turning on cockpit lighting and power really add to the enjoyment of the program. The graphics are effective from inside the cockpit to travelling down the tunnel leaving the safety of the Starbase and encountering the starry atmosphere.

Correct speed and positioning on leaving and entering the Starbase is essential to avoid being shot down by the Starbase auto-defence system.

Interdictor pilot is well worth getting to grips with. The manual may look daunting, but it's an entertaining read.

Incidentally, this one's written by a retired Commodore, L Marshall.

Contact: Supersoft, Winchester House, Canning Road, Harrow. Tel: 01-861 1166.

SPACE SHUTTLE

As this space flight simulation program arrived just before we went to print, we can't give it a full review this month. However, on first impressions it looks like an interesting package.

A 32-page four-colour flight manual accompanies the cassette. You also get a cardboard 'flight deck controls' overlay to place over the 64's function keys. Nothing special, but a nice touch and also useful in remembering which key does what.

Graphics look good as you take off in your space shuttle and speed towards the stars. Your mission is to launch, rendezvous and dock with an orbiting satellite as many times as possible. A demonstration flight shows you how it's all done.

Sound is also effective with realistic engine noise and various bleeps as you touch controls.

Contact: Activision (UK), 15 Harley House, Marylebone Road, London NW1. Tel: 01-486 7588.

SPITFIRE ACE

Biggles to the rescue! Or maybe that's not appropriate in this American offering complete with the old 'Stars and Stripes' playing as the program loads.

Cassette-sized documentation provides the instruction for this game — and it is more game than true flight simulation.

Choose your scenario from a list ranging from Malta-based RAF attacks against Rommel's Africa Corps, to the Blitz defending London from the Luftwaffe.

Your mission is summarized on the screen, which also indicates scores and previous victories you may have accumulated.

The killing instinct comes out as you dive towards the enemy, guns firing. Beware, he fires back. Nice graphical touches here are the red flashes when you are under fire and the bullet holes which appear in your screen when hit, heralding a fatal plunge to the ground. Joystick control is quite sensitive and it's enjoyable for those who are not taking flying too seriously.

Contact: MicroProse, distributed by US Gold, Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, W Midlands. Tel: 021-359 3020.

FLIGHT SIMULATOR

As in 747 Flight Simulator, you have to take-off from Heathrow and land at another airport (this time you get a choice of eight).

The only written instructions are on the back of the cassette sleeve: all explanations of abbreviations and technical information appear on the screen before the program is finished loading. Here it helps to have a photographic memory!

On the other hand, screen prompts are provided for the inexperienced when landing which, while perhaps not quite so realistic, can prove invaluable.

A map can be called up at any time to show your location. There is also a map reference table and you must fly to exact map reference locations before any attempt to land. All navigation is performed using a grid system. I found this tricky to get to grips with.

Graphics are simple including only a view of the runway and, after take-off, green representing land and blue representing sea.

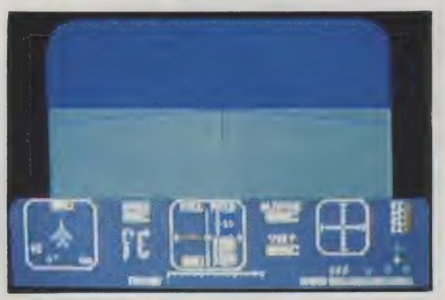
Contact: Anger Productions, 14 The Oval, Broxbourne. Tel: 0992 461156.

FIGHTER PILOT

A real-time flight simulation based on the F—15 Eagle, USAF air-superiority jet fighter, Fighter Pilot offers you realistic flying (and crashing) experience.

You are given several options including landing practise (tricky!), air-to-air combat (actually tracking down your enemy is the hardest bit), and blind landing (navigation by radar, flight map and computer only).

Instructions are given on the cassette sleeve which opens up to double the usual size. These should be read very carefully before attempting anything. The section headed Pilot's Notes should be learnt.



Control is via the keyboard, although a joystick can be used for aircraft movement.

Fighter Pilot is worth persevering with. When you finally get to grips with it, it offers realistic flying experience.

Contact: Digital Integration, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey. Tel: 0276 684959.

SOLO FLIGHT

"As close to the real thrill of flying as you can handle!"

Well, if that sounds American, you're right. Piloting a light plane (the sound effects certainly make it sound shaky!), Solo Flight gives you the option of flying practise or the Mail Pilot game.

Complete with a 16-page instruction leaflet, this program allows you to fly in three different American states — Washington, Colorado and Kansas.

A bonus is the demonstration mode which guides you through a practise flight.

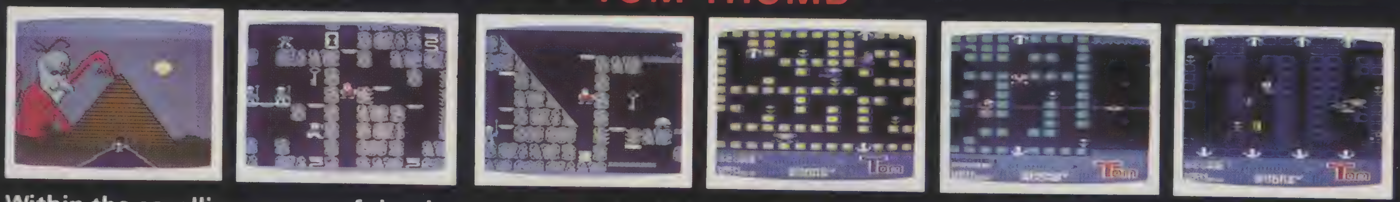
Graphics show the terrain you are passing over and are realistic in that when you fly above clouds, ground objects are not visible. In these instances you rely on the IFR (instrument flight rules) and navigate by instruments alone.

The attraction of an IFR flight is the resulting map projected onto the screen which illustrates the course you actually flew. Solo Flight is entertaining, but less realistic than other flight simulators we looked at.

Contact: MicroProse, distributed by US Gold, Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, W Midlands. Tel: 021-359 3020.

New Releases

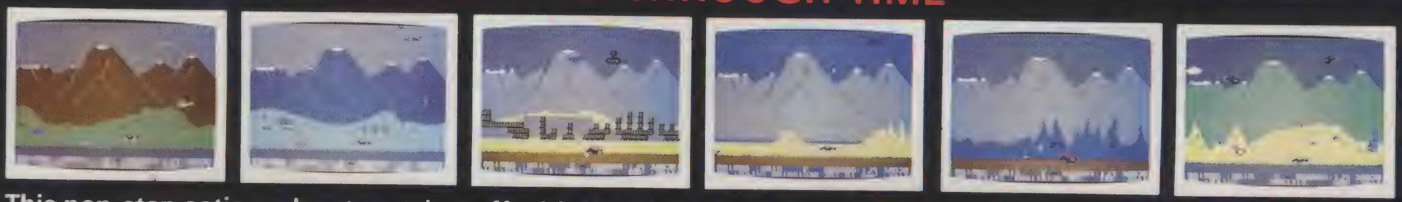
TOM THUMB



Within the scrolling mazes of the six pyramids lie the 48 keys which will unlock the secrets of the ancient Egyptians. Each maze can be viewed as a whole to help you plan your strategy and chart your way. You need superb timing to acquire the keys and fit them in the correct keyholes. The Vic 20 version also has six scrolling mazes and numerous perils to be faced as you collect the treasures in order to survive.

J.S. COMMODORE 64 VIC 20 16K £5.95

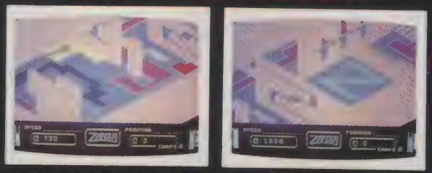
BATTLE THROUGH TIME



This non-stop action adventure takes off with World War II spitfires, jet fighters in Korea and helicopter attacks in the Vietnam war, moving on through time to the murderous weapons of World War III. The mutant offensive brings about the end of civilisation followed by the dawn of pre-historic times and the vicious pteradacktyls. Excellent graphics and sound effects bring this seven stage "Battle Through Time" to life.

J.S. COMMODORE 64 £7.95

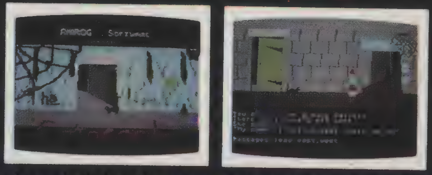
ZAGA MISSION



A diagonally scrolling maze lies ahead of you. There are no enemy fighters or ground fire to destroy you. You have total speed control of a highly manoeuverable helicopter and it will hover while you work out your approach. Absolute concentration is essential to complete ten stages of the "Zaga Mission".

J.S. COMMODORE 64 £7.95

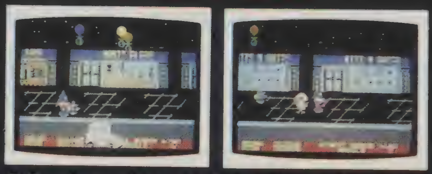
CATACOMBS



A sealed door bars your entry to an intriguing role playing adventure. Sequence of appropriate words swings the door open to another location. Each location is shown in superb graphics to assist you in your fight for survival. Save adventure facility.

K.B. COMMODORE 64 £7.95

P.C. FUZZ



P.C. Fuzz has nothing but his flying truncheon to capture the money being literally spirited away by the local mafia. Jostled by punks on pogo sticks and wobbled by well oiled patrons of the local inns at the closing time, he pursues the villains with vigour.

J.S. COMMODORE 64 £7.95

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Readers

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INTERNATIONAL SOCCER

International Soccer heralds Commodore-first REAL game for the 64... and what a game!

A cartridge-based game, it's a sporty simulation combining stupendous sound,amazing animation with perfect playability and graphics that will make you gawp in awe!

After choosing 1/2 player game, 1-9 difficulty level, and your colours, the team emerge from the tunnel to the delight of the packed stadium. An authentic whistle, and you're off! A pass out to the wing, an elusive dribble, a teasing cross, and the centre forward chip it goalwards, leaving the keeper waving an imaginary tennis racket.

The teams go in for a brief rest at half-time, and at the end of the game the winning team are presented with a cup.

It's these little things that make this game special ... the presentation, the swaying crowd, the advertising boards, the ball's shadow ... almost every aspect of real-life football is here. Buy it!

Title: International Soccer
Programmer: Andrew Spencer
Company: Commodore, 1 Hunters Lane, Weldon, Corby, N Hants. Tel: 0536-205555
Hardware: 64, joysticks
Type of game: Arcade/simulation
Description: One or two player football simulation
Graphics: *****
Sound: ***
Playability: *****
Readers' Rating: *****
Price: £9.99
Reviewer: Tim Burke of Atherton, Manchester

DEFENDER

Patrol the planet protecting and rescuing as many humans as possible. You have three ships equipped with laser cannon and smart bombs. This is one of the best, shoot-em-up, games I have seen. The graphics are sharp and clear, the action is fast and furious. Particularly good use of colour and choice of background make the screen very attractive. The scrolling, in both directions, is very smooth. Ships and bombs are awarded for high scores, a bonus is added for the number of humans that survive. As you blast 'Landers' and 'Mutants', dodge 'Space mnines', catch falling humans and set them down safely, you may just have time to glance at the scanner which shows approaching aliens in front and behind. If it all gets too much you can jump to hyperspace and hopefully reappear somewhere quieter. To say you need fast reactions is a gross understatement.

My only criticism would be that to drop a bomb or to jump to hyperspace the player must look down at the keyboard. A moments hesitation is fatal in this game. The only solution is one handed joystick operation, tricky if yours doesn't have rubber feet or suckers.

The game offers a real test of arcade skills and is highly addictive.

Title: Defender
Programmer: I Gray
Company: Interceptor Software, Lindon House, The Green, Tadley, Hants. Tel: 07356 71145
Hardware: 64, cassette recorder, joystick
Type of game: Arcade
Description: Shoot aliens to protect humans and prevent the planet from exploding
Fast loader: None
Graphics: ***
Sound: ***
Playability: *****
Readers' Rating: ****
Price: £7 (cassette), £9 (disk)
Reviewer: P Dent of Seaham, Co. Durham

JET SET WILLY

This complex platform game features Miner Willy, already famous for his exploits in that top-selling platform game, Manic Miner.

The basis for the game at first sounds rather an unusual one. Rich from your adventures in the mines, you have bought a huge mansion with a beach nearby. You have also got a yacht. Due to your wealth you have held many big parties and on this very night you have held just such a party. Very nice you may think, but there is a catch. Your housekeeper Maria won't let you go to bed until you have collected up ALL the glasses, plates, etc that your friends have left lying around the mansion. Sounds easy? I can assure you it is not.

As you journey round your mansion you discover numerous unwanted guests remaining, in the form of walking penknives and barrels that float around rooms as if by magic. These items must be avoided at all costs.

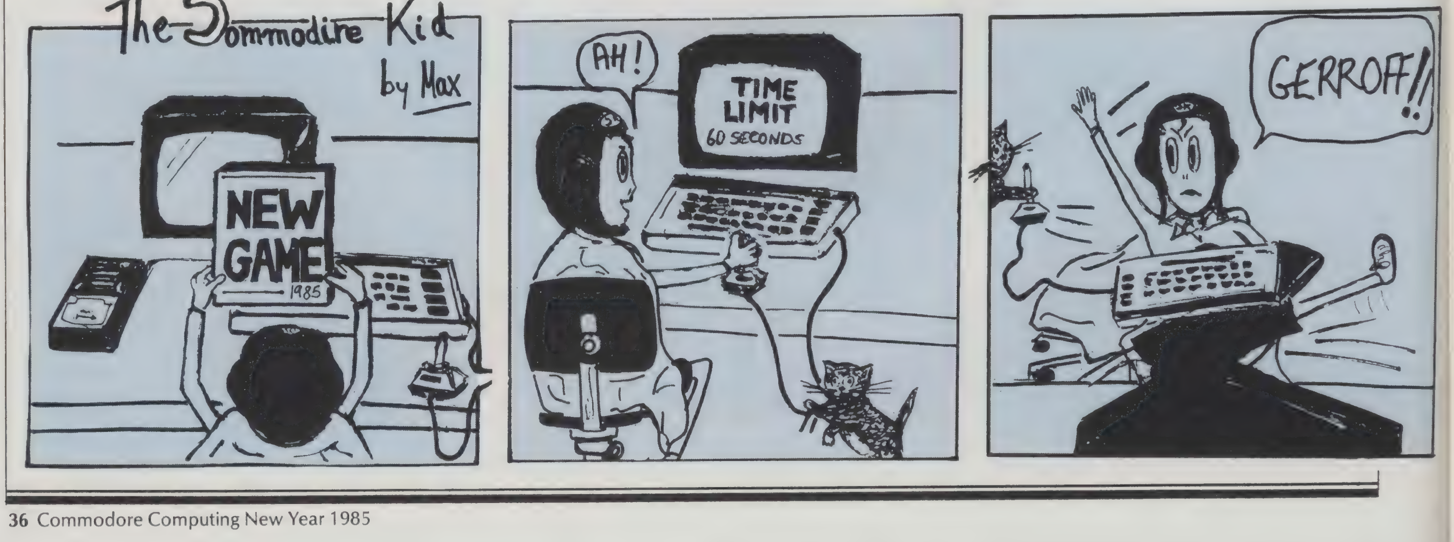
The game features 68 fully interlocking rooms, which you just walk or jump into.

The graphics are well designed, but rather dull. A few splashes of colour would have helped considerably.

A clear, but rather morbid tune is played throughout your game unless you have the sense to turn it off by pressing 'Return'.

The game is very addictive and you find that time passes very quickly when you are playing, so beware!

Title: Jet-Set Willy
Programmer: Shahid Ahmad
Company: Software Projects, Bear Brand Complex, Allerton Road, Woolthan, Liverpool. Tel: 051-428 7990
Hardware: 64, cassette recorder, joystick
Type of game: Arcade adventure
Description: Collect all the objects left by your friends
Fast loader: Yes
Graphics: ***
Sound: ***
Playability: ****
Readers' Rating: ****
Price: £7.95 (cassette), £12 (disk)
Reviewer: John Archer of Ashbourne, Derbyshire



s' Choice

isagree (or agree) with the CCI
aders write their own reviews of
ite games

ZAXXON

Zaxxon is Synsoft's official version of the well-known arcade game. Most people will know the Zaxxon saga by now. For those of you who don't, the object of the game is to destroy the infamous zaxxon robot having first overcome its defences — namely missiles (watch out for the homing ones!), gun replacements, enemy fighters, brick walls (in space?) and force fields.

The graphics are not complex, but clear and neat: the trade mark of most Zaxxon games. Most of the effects, such as explosions, are very realistic. The perspective, however, is far from faultless and can be very misleading if the player is not familiar with the game.

Although the sound during the game is reminiscent of Space Invaders, there is a very good rendition of a well-known American tune played during loading which removes the boredom to some extent, but as it stands the loading time is quite short anyway.

To conclude, I found Zaxxon a highly addictive zap which caters for all grades of player. It won't be a case of "Whump! Whump! Whump! ... game over" if it's your first go, but if you like a challenge the action heats up considerably on higher levels. Nice one Synsoft!

Title: Zaxxon
Programmer: American author
Company: Synsoft via US Gold, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH. Tel: 021-520 7591
Hardware: 64, disk drive/cassette recorder, joystick
Type of game: Arcade
Description: Fly through an enemy fortress avoiding various hazards to destroy the Zaxxon robot
Fast loader: Novaload
Graphics: ***
Sound: ***
Playability: *****
Readers' Rating: *****
Price: £9.95 (cassette), £14.95 (disk)
Reviewer: Craig Pemberton of Netherton, Merseyside

FOOTBALL MANAGER

Even if you're not a football fanatic, this addictive game is well worth a second (or third) glance at. In my opinion it has to be the most absorbing game of the year, a view seemingly shared by many computing magazines.

There are seven skill levels to play at, and at the beginning you choose the team you wish to manage and then commence the season in Division 4. (Yes, Ron Atkinson, that's where my management of Manchester United had to begin.)

Team selection completed, you begin your first match of the season and can sit back to watch the goalmouth incidents at both ends. This is where Kevin Toms (the designer) has excelled. The realistic players wearing correct team colours can dribble, pass, tackle, score and miss from point blank range. Very reminiscent of Match of the Day.

Then, the final score shown, the rest of the division's results are viewed (lovely teleprinter effect) followed by League Table and players available on the Transfer Market, along with the finances.

The game can be saved to tape so that when you've progressed to the First Division you can recommence from there. (You can also be sacked, by the way.)

My only criticism of the game, albeit minor, is the loading time of 20 minutes! (The longest I have come across.) Nevertheless great value for £7.99.

Title: Football Manager
Programmer: Kevin Toms
Company: Addictive, 7a Richmond Hill, Bournemouth BH2 6HE. Tel: 0202-296404
Hardware: 64, cassette recorder, joystick
Type of game: Sport simulation
Description: Manage your favourite team
Fast loader: None
Graphics: ****
Sound: *
Playability: *****
Readers' Rating: ****
Price: £7.99
Reviewer: Kevin Exley of Leeds, Yorkshire

DINKY DOO

My fears have been confirmed! Cheese before bedtime does give you nightmares!

So runs the plot of Dinky Doo. Poor little Dinky (a lovable round blob) is having nightmares, your job is to guide him around the screen and to the milk which will allow him to clear the screen.

Sounds like a piece of cheese doesn't it? Except that the best nightmares are never quite as easy as that. Snakes, monsters and electrified walls all make your task that much more challenging.

The 15 screens of graphics are average but the game is saved by an interesting plot.

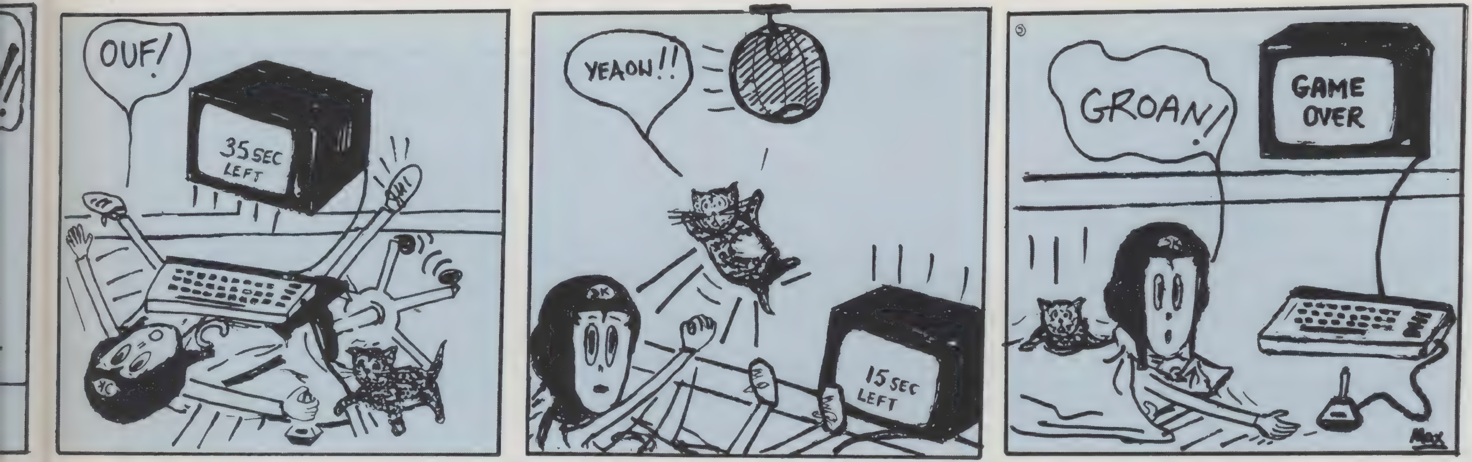
In my nightmares I never seem to move fast enough so I suppose the slight sluggishness of Dinky is excusable.

Dinky Doo wasn't exactly a smash but it was obviously popular enough to inspire Pyjamarama.

The music, while it loaded, was pleasing as it was a vast improvement on the usual blank screen and boredom that accompany most games when loading.

Not outstanding, but all in all an amusing and addictive game.

Title: Dinky Doo
Programmer: Damian McComb
Company: Software Projects, Bear Brand Complex, Allerton Road, Woolton, Liverpool, Merseyside, L25 7SF. Tel: 051-428 7990
Hardware: 64, cassette unit, joystick
Fast loader: None
Graphics: ***
Sound: **
Playability: ***
Readers' Rating: ***
Price: £
Reviewer: Julien Francois of Manor Park, London



TOP TWENTY

	TITLE	CHANGE	COMPANY	PRICE (£)
1	Ghostbusters	UP	Activision	10.99
2	Raid Over Moscow	DOWN	Access/US Gold	9.99
3	Hunchback II	NEW	Ocean	7.95
4	Fighter Pilot	DOWN	Digital Integration	9.95
5	Kong Strikes Back	NEW	Ocean	7.95
6	International Football	NEW	Commodore	14.95
7	Pyjamarama	UP	Mikro-Gen	7.95
8	Combat Lynx	NEW	Durell	8.95
9	Select 1	UP	Computer Records	12.95
10	Blue Max	NEW	Synsoft/US Gold	9.95
11	Black Thunder	NEW	Quicksilva	7.95
12	Tapper	NEW	Sega/US Gold	9.95
13	Eddie Kidd Jump Challenge	NEW	Martech	7.95
14	Tornado Low Level	NEW	Ocean	7.90
15	Space Shuttle	NEW	Activision	9.99
16	Match Point	NEW	Psion	7.95
17	Spiderman	NEW	Adventure International	9.95
18	BC's Quest for Tires	NEW	Software Projects	9.95
19	Boulder Dash	DOWN	Statesoft	8.95
20	Daley Thompson Decathlon	NEW	Ocean	7.90

BUBBLING UNDER

Quango	NEW	Interceptor	7.95
Tom Thumb	NEW	Anirog	7.95

Compiled by Microdealer UK

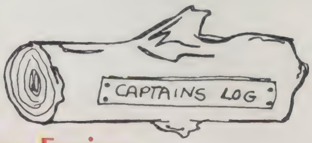
Mission complete

The final frontier is reached as we give you the last part of Richard Franklin's Star Trek mega-adventure. Beam me up Scotty!

The version of Startrek reproduced in this book was taken from a main-frame version and converted to work on the 64. The game is a text based adventure type game where you, the commander of the Starship Enterprise, have to go around a galaxy destroying all Klingons that you encounter.

There are two types of Klingons, the normal ones 'K' which are not that hard to destroy and the command ships 'C' which are a much tougher breed. You are allotted a certain amount of time to destroy the Klingons after which your mission will be deemed as a failure.

Along with the normal commands such as warp drive, short range scan, long range scan, photon torpedoes, and phasers, a number of experimental devices are on board which you may (or may not) choose to use. These devices are prone to accidently backfiring etc the effects of this are that the Enterprise (or you) are destroyed.



Warp Engines

This is obtained by command '0' and is the method to move. After typing in the command 0, you are asked for the direction of travel (course). This value is in the range 0-8.999 and works in an anti-clockwise direction

4 3 2
5-*-1
6 7 8

The second question is the warp factor. this valuedetermines how far you will travel:

0.25 Travels 2 sectors
0.5 Travels 4 sectors
1.25 Travels 1 quadrant
2.5 Travels 2 quadrants
etc.

A warp factor of 12 will be available after 9 solar years. This warp will open up a time portal for travel back and forward in time but has a 0.4 probability of nuclear implosion.

Short range sensor

This is obtained by the command '1' and will display the current quadrant that you are in. 'E' is yourself, 'K' and 'C' have been explained, 'B' is a Base (friendly),. and '*' are the stars.

To dock with the Base, move to an adjacent position and do a short range scan.

Long range sensor

By typing '2', the 8 quadrants around the one that you are in and the one you are in are displayed giving a number that denotes the number of Klingons, Bases, and stars: 218 means 2 Klingons, 1 Base, and 8 stars.

Phasers

'3' will allow you to fire the phasers. You can fire part of all of the energy available. The energy you select will be divided up between all Klingons in the quadrant and the effect will depend on the distance away.

Photon Torpedoes

By entering '4', the Photon torpedoes can be fired. there is a limitation on the number that you have (13 to start) but they will be replenished upon docking. The direction to fire is given as the direction of travel. if a photon torpedo hits a target, it will be destroyed unless the Klingon takes evasive action.

Damage control report

The command '5' will display status of each device. If the value is 0, it means that the device is in perfect working order.

Self destruct

'6' enters the self destruct sequence. This will count down from 10 and when it has reached 5, the fail safe mechanism is activated requesting for the secret password to continue.

Abandon Ship

Upon entering '7', you will be asked whether you wish to re-consider. Upon typing 'N', you will abandon ship and will be given a new ship that is much les powerful.

Activate Energy Shields

'8'. The energy shields cannot be fired through and will thus need lowering first.

Deactivate Energy Shields

'9'. This will lower the shields.

Fire Experimental Death ray

'10'. this is, as it suffests, a very unsafe device to use. Once it is most likely that it cannot be used again. It cannot be used until 8 solar years have past. This device causes very wierd effects.

Activate Teleporter

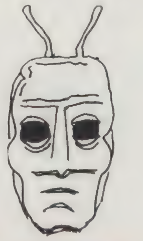
'11'. The teleporter will instantaneously transport you to your Base. The teleporter can be used an infinite number of times (after 5 solar years have passed) but it can sometimes fail.

Engage Impulse drives

'12'. Impulse drives use up 400 power units to engage and sometimes will Implode!

Rest

'13'. This will rest for 0.5 stardate and is useful to allow maintainance to damage devices.



Current position and stardate

'14'. This will display your current position and the time elapsed.

Galaxy starchart

'15'. To display the chart of the entire galaxy, enter this command. The location that you are in is reversed and only locations visited by you or displayed on a long range scan will show.

Command Table

'16'. This is the last command and just lists the commands available.

```
934 PRINT"          ▓***** ABANDON SHIP *****"
935 PRINT"          ▓***** ABANDON SHIP *****"
936 PRINT"▓SERIES ENTER-BLITZ INITIATED."
937 PRINT"FAIL-SAFE AUTO-OVERRIDE INSERTED."
938 PRINT"▓COMMANDER AND SELECT FEMALE CREW ";
939 PRINT"ESCAPE IN SHUTTLE CRAFT."
940 PRINT"▓***ENTERPRISE REDUCED TO SUB-ATOMIC"
941 PRINT"           PARTICLES***"
942 A7=5:N1=1:N9=1:T=T+1
943 PRINT"▓▓ABANDONING SHIP COSTS 1 STARDATE."
944 T1=VAL(TI$)
945 IFT1+12>VAL(TI$)THEN945
946 IFT<T0+T9THEN951
947 PRINT"▓▓   *** SO LONG, SPORT ***"
948 N1=0
949 PRINT
950 GOTO654
951 GOTO210
952 :
953 IFB7<>0THEN978
954 IFV>=2THEN957
955 IFRND(1)>.15THEN1011
956 GOTO958
957 IFRND(1)>.10THEN1011
958 B8=2+INT(2.5*RND(1))
959 M1=0
960 M2=0
961 Z3=INT(RND(1)*L8+1)
962 Z4=INT(RND(1)*L8+1)
963 IFG(Z3,Z4)>999THEN1011
964 S4=G(Z3,Z4)-INT(G(Z3,Z4)/9.999)*10
965 IFS4<=0THEN1011
966 :
967 GG=G(Z3,Z4)
968 B4=INT(GG/9.999)-(INT(GG/99.99)*10)
969 IFB4<>1THEN985
970 PRINT"▓** EMERGENCY SUB-SPACE COMUNICATION";
971 PRINT" TO  THE "N$" FROM STARBASE IN ";
972 PRINT"QUADRANT"
973 PRINTZ3"-"Z4". **"
974 PRINT"▓SUPERNOVA IMMINENT UNLESS STAR ";
975 PRINT"BY PHOTON TORPEDO."
976 B5=Z3
977 B6=Z4
978 B7=B7+1
979 S4=G(B5,B6)-INT(G(B5,B6)/9.999)*10
980 IFS4<=0THEN1010
981 Z3=B5
982 Z4=B6
983 IFB7>B8THEN985
984 GOTO1011
985 PRINT"▓***********************************";
986 PRINT"***** SUPERNOVA IN QUADRANT"Z3"-"Z4
987 PRINT"ALL THE MATTER IN THIS QUADRANT"
988 PRINT"CONVERTED TO ENERGY."
989 IFQ1<>Z3ORQ2<>Z4THEN995
990 PRINT
991 GOSUB1093
992 PRINT"UNFORTUNATELY, THE "N$" WAS IN"
993 PRINT"THIS QUADRANT."
994 GOTO558
995 PRINT"FROM NOW ON, ANY VESSEL STOPPING IN ";
996 PRINT"THISQUADRANT WILL BE TOTALLY ";
997 PRINT"ENERGIZED."
998 PRINT"********************";
999 PRINT"********************"
```

```
1000 K4=INT(G(Z3,Z4)/99.99)
1001 B4=INT((G(Z3,Z4)/99.99-K4)*10.0)
1002 B9=B9-B4
1003 K9=K9-K4
1004 M1=Z3
1005 M2=Z4
1006 IFK9<=0THEN671
1007 G(Z3,Z4)=1000
1008 C0(Z3,Z4)=G(Z3,Z4)
1009 GOSUB1211
1010 B7=0
1011 :
1012 IFRND(1)>.10THEN1042
1013 FOR I=1 TO 9
1014 IFC(I,1)<>Q2THEN1016
1015 IFC(I,2)=Q2THEN245
1016 NEXT I
1017 I=INT(RND(1)*4*R8+1)
1018 IFC(I,1)>.5THEN1021
1019 FOR I=1 TO 9
1020 IFC(I,1)<=.5THEN1041
1021 IFC$<>"DOCKED"THEN1026
1022 PRINT"▓MAGNETIC TRACTOR BEAM FROM
     QUADRANT"
1023 PRINTC(I,1)"-"C(I,2);
1024 PRINT"DEFLECTED BY STARBASE SHIELDS."
1025 GOTO1042
1026 Q1=C(I,1)
1027 Q2=C(I,2)
1028 S1=INT(RND(1)*8+1)
1029 S2=INT(RND(1)*8+1)
1030 PRINT"▓"N$" CAUGHT IN MAGNETIC TRACTOR"
1031 PRINT"BEAM."
1032 PRINT
1033 T=T+.5
1034 W9=RND(1)
1035 FOR J=1 TO 7
1036 D(J)=D(J)+1
1037 IFD(J)<=0THEN1039
1038 D(J)=0
1039 NEXT J
1040 GOTO104
1041 NEXT I
1042 GOTO245
1043 :
1044 PRINT"▓** HEY STUPID.";
1045 PRINT" YOU WERE WARNED NOT TO"
1046 PRINT"STOP IN A QUADRANT ";
1047 PRINT"WHERE A SUPERNOVA HAD";
1048 PRINT"OCCURRED."
1049 GOTO1267
1050 :
1051 IFN1=1THEN1056
1052 E=E0
1053 A9=3000
1054 P=13
1055 GOTO1059
1056 E=2000
1057 A9=2000
1058 P=8
1059 A7=0
1060 FOR I=1 TO 7
1061 D(I)=D(I)+2
1062 IFD(I)>0THEND(I)=0
1063 NEXT I
```

```
1064 RETURN
1065 :
1066 IFD(7)>=0THEN1069
1067 PRINT"▒ENERGY SHIELDS DISABLED."
1068 GOTO214
1069 IFC5=0THEN1072
1070 PRINT"▒ENERGY SHIELDS ALREADY ACTIVATED."
1071 GOTO214
1072 IFA9>=200THEN1075
1073 PRINT"▒SHIELD ENERGY DRAINED."
1074 GOTO214
1075 PRINT"▒ENERGY SHIELDS ACTIVATED."
1076 C5=200
1077 Z$="UP"
1078 A9=A9-C5
1079 IFE<=0THEN653
1080 GOSUB608
1081 GOTO214
1082 :
1083 PRINT
1084 IFC5>0THEN1087
1085 PRINT"ENERGY SHIELDS ARE ALREADY DOWN."
1086 GOTO1092
1087 PRINT"ENERGY SHIELDS DEACTIVATED."
1088 C5=0
1089 Z$="DOWN"
1090 GOSUB608
1091 IFE<=0THEN653
1092 GOTO214
1093 :
1094 IFN1<>1THEN1098
1095 A5=5
1096 N$="GARBAGE SCOW"
1097 GOTO1100
1098 N$="ENTERPRISE"
1099 A5=1
1100 RETURN
1101 :
1102 PRINT
1103 Z$="DOWN"
1104 A9=2000
1105 FORI=1TO8
1106 FORJ=1TO8
1107 K3=INT(G(I,J)/99.99)
1108 B3=INT((G(I,J)/99.99-K3)*10.0)
1109 IFB3>0THEN1122
1110 NEXT J
1111 NEXT I
1112 PRINT"▒  YOU HAVE BEEN TAKEN TO KLINGON"
1113 PRINT"HEADQUARTERS. IF YOU HAD A STARBASE,"
1114 PRINT"YOU WOULD BE REPATRIATED";
1115 PRINT" AND GIVEN A NEW";
1116 PRINT"STARSHIP TO COMMAND.";
1117 PRINT" SINCE YOU HAVE NO"
1118 PRINT"STARBASE, YOU WILL BE MERCILESSLY"
1119 PRINT"TORTURED TO DEATH."
1120 N7=1
1121 GOTO1147
1122 N9=2
1123 T=T+1
1124 Q1=I
1125 Q2=J
1126 E=2000
1127 P=8
1128 N1=1
1129 PRINT"▒  YOU HAVE BEEN SENT ";
1130 PRINT" BACK TO STARFLEET"
1131 PRINT"COMMAND. ";
1132 PRINT"YOU ARE NOW IN COMMAND OF A NEW";
1133 PRINT"STARSHIP, ";
1134 PRINT"THE FEDERATION'S ONE AND ONLY"
1135 PRINT"SPACE JUNK COLLECTOR ----"
1136 PRINT"▒  THE GARBAGE SCOW,"
1137 PRINT"WHICH LOOKS LIKE /G/ ON THE SCAN."
1138 PRINT"▒  THE SMELLY GARBAGE";
1139 PRINT" SCOW IS CURRENTLY"
1140 PRINT"IN QUADRANT"Q1"-"Q2"."
1141 PRINT"TRY TO BE MORE CAREFUL THIS TIME."
1142 FOR I=1 TO 7
1143 D(I)=0
1144 NEXT I
1145 PRINT
1146 GOTO364
1147 RETURN
1148 Q$(0)="▒.▒":Q$(1)="▒E▒"
1149 Q$(2)="▒K▒":Q$(3)="▒B▒"
1150 Q$(4)="▒*▒":Q$(5)="▒G▒"
1151 Q$(6)="▒C▒"
1152 RETURN
1153 :
1154 PRINT"▒"
1155 PRINT"    SERIES ENTER-BLITZ INITIATED."
1156 PRINT"IN TEN SECONDS THIS VESSEL WILL
     SELF-"
1157 PRINT"                   DESTRUCT."
1158 PRINT"▒10"
1159 GOSUB1308
1160 PRINT"   ▒9"
1161 GOSUB1308
1162 PRINT"     ▒8"
1163 GOSUB1308
1164 PRINT"       ▒7"
1165 GOSUB1308
1166 PRINT"         ▒6"
1167 GOSUB1308
1168 PRINT"           ▒5"
1169 PRINT"    ▒T MINUS 5 SECONDS AND HOLDING."
1170 PRINT"FAIL-SAFE MECHANISM ENGAGED.ONLY
     THE"
1171 PRINT"COMMANDER OF THE STARSHIP CAN ";
1172 PRINT"OVERRIDE"
1173 PRINT"   WITH HIS SECRET PASSWORD.
     SCIENCE"
1174 PRINT"OFFICER SPOCK HAS ALREADY ENTERED
     HIS"
1175 PRINT"        CORRECT COUNTER-PASSWORD."
1176 PRINT"▒TO CONTINUE SERIES ENTER-BLITZ,
     TYPE"
1177 PRINT"  YOUR SECRET PASSWORD :▒";
1178 INPUT#2,V$:PRINT
1179 IFV$<>X$THEN1189
1180 PRINT"▒▒             ▒4"
1181 GOSUB1308
1182 PRINT"               ▒3"
1183 GOSUB1308
1184 PRINT"                 ▒2"
1185 GOSUB1308
1186 PRINT"                   ▒1"
1187 GOSUB1308
```

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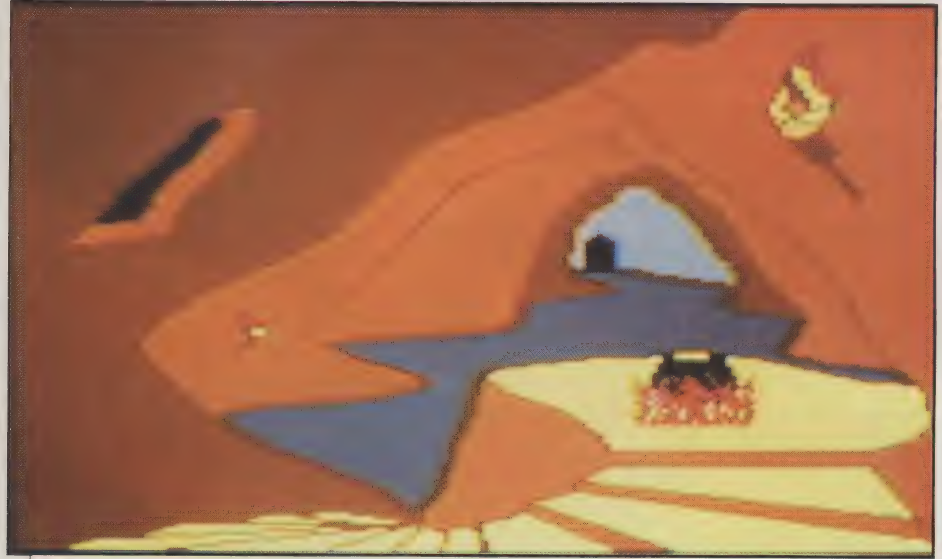
1188 GOTO553
1189 PRINT
1190 PRINT"▮      ▮SERIES ENTER-BLITZ TERMINATED."
1191 PRINT
1192 GOTO210
1193 :
1194 PRINT"▮IMPULSE ENGINES ON STANDBY."
1195 PRINT
1196 PRINT"▮COURSE (1-8.9999)   :";
1197 INPUT#2,C1$:PRINT:C1=VAL(C1$)
1198 IFC1<1THEN214
1199 IFC1>=9THEN1196
1200 PRINT"▮WARP FACTOR (1-5)   :";
1201 INPUT#2,W1$:PRINT:W1=VAL(W1$)
1202 IFW1<1THEN214
1203 IFW1>5THEN214
1204 PRINT"▮IMPULSE ENGINES ENGAGED."
1205 C$="MOVING":POKE53280,12
1206 E=E-400
1207 IFE<=0THEN654
1208 IFRND(1)<.85THEN952
1209 PRINT"▮IMPULSE ENGINES IMPLODE."
1210 GOTO558
1211 :
1212 FOR C2=1 TO 9
1213 IFC(C2,1)=0THEN1218
1214 IFC(C2,1)<>Z3THEN1218
1215 IFC(C2,1)<>Z4THEN1218
1216 C(C2,1)=0
1217 GOTO1219
1218 NEXT C2
1219 RETURN
1220 :
1221 IFT>T0+4.99THEN1225
1222 PRINT"▮TELEPORTER CANNOT BE USED UNTIL"
1223 PRINT"STARDATE"T0+5
1224 GOTO214
1225 IFW9>.25THEN1230
1226 PRINT"▮COMMUNICATIONS WITH";
1227 PRINT" BASE TEMPORARILY"
1228 PRINT"LOST--TELEPORTER, SHE NO WORK."
1229 GOTO214
1230 H1=H1+1
1231 IFH1<=H2THEN1235
1232 PRINT"▮TELEPORTER CAPABILITY";
1233 PRINT" PERMANENTLY LOST."
1234 GOTO214
1235 PRINT"▮TELEPORTER ACTIVATED."
1236 FOR I=1 TO 8
1237 FOR J=1 TO 8
1238 K3=INT(G(I,J)/99.99)
1239 B3=INT((G(I,J)/99.99-K3)*10.0)
1240 IFB3>0THEN1244
1241 NEXT J
1242 NEXT I
1243 GOTO1226
1244 Q1=I:Q2=J
1245 IFRND(1)>.15THEN1251
1246 PRINT"▮DISINTEGRATOR/INTEGRATOR";
1247 PRINT" MALFUNCTION--"
1248 PRINT"STARSHIP REORIENTATED UNUSABLE."
1249 PRINT"YOU ATE THAT ONE!"
1250 GOTO558
1251 GOTO364
1252 :
1253 IFF>2THEN1264
1254 PRINT"⊐▮STARSHIP ENCOUNTERS END OF GALAXY."
1255 PRINT"▮  FOOLISH MORTAL,";
1256 PRINT" YOU HAVE ATTEMPTED TO"
1257 PRINT"VENTURE OUT OF ";
1258 PRINT" THE GALAXY INTO SUB-SPACE";
1259 PRINT"▮  ON THE THIRD TIME";
1260 PRINT" YOU TRY THIS, THE "
1261 PRINT"LIVING GOD, KORP WILL DESTROY YOU."
1262 F=F+1
1263 GOTO1270
1264 PRINT"⊐▮    YOU HAVE DARED TO ";
1265 PRINT"ENTER SUB-SPACE    ";
1266 PRINT"           A THIRD TIME."
1267 PRINT"FOR THIS,"
1268 PRINT"      ************YOU DIE*************"
1269 GOTO553
1270 RETURN
1271 :
1272 R1=INT(10*RND(1)+1)
1273 R2=INT(10*RND(1)+1)
1274 IFQ(R1,R2)<>0THEN1272
1275 RETURN
1276 PRINT"⊐▮▮▮ORDERS:                STARDATE=▮"T
1277 PRINT"▮    AS CAPTAIN OF THE";
1278 PRINT" UNITED STARSHIP"
1279 PRINT"ENTERPRISE, ";
1280 PRINT"YOUR MISSION IS TO DESTROY"
1281 PRINT"THE KLINGON INVASION ";
1282 PRINT"FORCE OF"K9"BATTLE"
1283 PRINT"CRUISERS. YOU HAVE"T9"SOLAR YEARS TO"
1284 PRINT"COMPLETE YOUR MISSION."
1285 PRINT"▮▮(I.E. UNTIL STARDATE"T0+T9")."
1286 IFB9>1THEN1290
1287 PRINT"▮▮YOU WILL HAVE ONE";
1288 PRINT" SUPPORTING STARBASE."
1289 GOTO1292
1290 PRINT"▮▮YOU WILL HAVE"B9;
1291 PRINT"SUPPORTING STARBASES."
1292 PRINT"▮CURRENT POSITION: QUADRANT"Q1"-"Q2
1293 PRINT"                         SECTOR"S1"-"S2
1294 PRINT"▮▮         ▮HIT ANY KEY TO CONTINUE▮";
1295 WAIT 197,64,64:POKE198,0
1296 PRINT"⊐";
1297 GOSUB1299
1298 GOTO104
1299 PRINT"⊐"
1300 RETURN
1301 PRINT"▮▮ DO YOU WISH TO PLAY AGAIN ?";
1302 INPUT#2,A$:PRINT
1303 IFA$="YES"THENRUN
1304 IFA$="Y"THENRUN
1305 PRINT
1306 PRINT"⊐            ▮** HAVE A NICE DAY ***"
1307 END
1308 T1=TI
1309 IFTI<T1+60THEN1309
1310 RETURN
1311 PRINT"⊐▮      TABLE OF COMMANDS AVAILABLE:"
1312 PRINT"▮0  - SET COURSE AND MOVE"
1313 PRINT"1  - SHORT RANGE SENSOR SCAN"
1314 PRINT"2  - LONG RANGE SENSOR SCAN"
1315 PRINT"3  - FIRE PHASERS"
1316 PRINT"4  - FIRE PHOTON TORPEDOES"
1317 PRINT"5  - DAMAGE CONTROL REPORT"
1318 PRINT"6  - SELF DESTRUCT"
1319 PRINT"7  - ABANDON SHIP"
1320 PRINT"8  - ACTIVATE ENERGY SHIELDS"
1321 PRINT"9  - DEACTIVATE ENERGY SHIELDS"
1322 PRINT"10 - FIRE EXPERIMENTAL DEATH RAY"
1323 PRINT"11 - ACTIVATE TELEPORTER"
1324 PRINT"12 - ENGAGE IMPULSE DRIVES"
1325 PRINT"13 - PAUSE"
1326 PRINT"14 - DISPLAY POSITION AND STARDATE"
1327 PRINT"15 - DISPLAY GALAXY CHART"
1328 PRINT"16 - DISPLAY THIS PAGE"
1329 GOTO210
READY.
```

Toil and trouble

Graphic adventure Macbeth heads this months selection of adventure and arcade games

All games reviews appearing in this magazine are personal opinions and serve only as a guide to new games on the market. Our star ratings for graphics, sound, playability and the CCI rating are as follows:

*** = Poor**
**** = Average**
***** = Good**
****** = Very good**
******* = Excellent**



MACBETH — THE COMPUTER ADVENTURE

In this case, Will Shakespeare might not turn over in his grave. This new, high quality offering from Creative Sparks lives up to the old man's standards, at least as far as computer games are concerned, in which case he wouldn't know anything about it anyway. But if he did ...

A combination of complex, colourful graphics, captivating text and those all-important little touches like flickering fires and creaking doors make Macbeth — The Computer Adventure one of the best new games of the season. The package of two cassettes along with a doumented text was put together with the expertise of Oxford Digital Enterprises — the text of "the Scottish play" having been edited specifically for this game from Oxford's computerised copy of the original First Folio published in 1623.

The ODE team is a powerful combination of physicists, computer programmers, doctoral students and artists: Scots, English, Australian and American. Every bit of that experience shows in the four superb adventures and the accompanying psychoanalysis programs in which the Royal Psychiatrist interviews the player.

In the first and fourth adventures, the player is Macbeth and must slay the realm's enemies or keep Dunsinane Castle safe from attack. The second adventure puts you in the role of Lady Macbeth helping your fated husband to do the dirty deed — kill King Duncan. In the third adventure, you must find the ten crucial ingredients for the witches' brew.

Clues and solutions often are found within the accompanying text. But don't despair; you needn't know the play intimately to succeed because the game is programmed with a help mode that either tells you where in the text the answer is found or gives you a riddle clue, although you'll have to take from there. The game also allows you to use more than the ordinary two word commands. This is achieved by technologically advanced "parsers" that understand at least 35 verbs, 35 nouns and 10 prepositions in addition to complex commands such as "Ask the cook to quickly jump into the fire".

Exciting graphics and sound are the highlights of these masterpieces. The excellent artwork, some animated, draws itself when each screen appears but avoids becoming tedious with its quick speed. Caves, seashores, room interiors, battlements all are drawn with great attention to detail. Meanwhile, you hear the rushing of the tide, screeching seagulls and a cat's meow at all the right times.

"We will proceed no further in this business," as Macbeth says. Thou gettest the point — 'Tis brilliant!

Title: Macbeth — The Computer Adventure
Programmers: Oxford Digital Enterprises
Company: Creative Sparks, Thomson House, 296 Farnborough Road, Farnborough, Hants GU14 7NU. Tel: 0252 543333
Hardware: 64, cassette unit
Type of game: Adventure
Description: Take on character roles in one of four adventures or be psychoanalysed in one of the roles
Fast loader: Yes
Graphics: *****
Sound: *****
Playability: *****
CCI Rating: *****
Price: £14.95 (cassette)

HAMPSTEAD

If you want to enjoy this adventure game, you'll either enjoy being insulted or brace yourself to take it as the joke that we hope it was meant to be.

The most degrading, impertinent, arrogant offering yet from Melbourne House, Hampstead is nevertheless an entertaining concept if you aren't sensitive about your social status, for few of us will ever "attain Hampstead" in the way it is presented here.

The player in this case is a social climber determined not only to live and be seen in Hampstead, but to "attain Hampstead", meaning he or she must adopt the right attitude, wear the right clothes, look at the right art, read the right books and so forth.

Furthermore, Hampstead minces no words. You are "a nobody" living in "a smelly Council flat", eating banana and cod sandwiches and watching some disgusting television show wholly unworthy of your potential social status. But the game doesn't really make the player feel worthy of anything.

What makes this game fun is that, for once in your life, you can be unscrupulous, underhanded and downright shifty without the least bit of shame, which I suspect was the purpose of writing it.

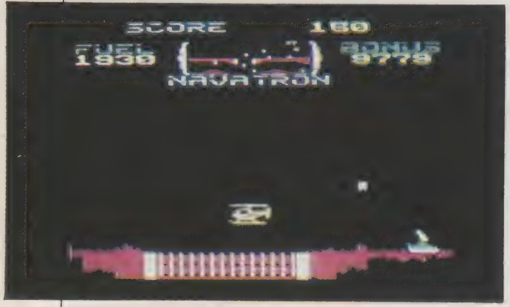
It's a pity there are no graphics other than the title screen with Hampstead. Nevertheless, the game tries hard to be offensive and succeeds, so if you can deal with that you probably will enjoy its snide comments and degrading manner. Besides, anyone above the million pound mark in worth probably wouldn't stoop to computer games anyway, and if they did they wouldn't stoop to cassettes.

Title: Hampstead
Programmers: Trevor Lever and Peter Jones
Company: Melbourne House, Castle Yard House, Castle Yard,Richmond, Surrey TW10 6TF. Tel: 01-940 6064
Hardware: 64, cassette unit
Type of game: Text adventure
Description: Climb the social ladder to Hampstead living through any means possible
Fast loader: Pavloda
Graphics: None
Sound: None
Playability: ****
CCI Rating: ****
Price: £9.95 cassette

FORT APOCALYPSE

Krālthan tanks, rotating field envelopes, hyper chambers and ... the ominous Fort Apocalypse — all ingredients to be avoided in this copter arcade blast.

And blast is what you must do to destroy the Kralthans and their Fort and rescue 18 of your friends. But a myriad of destructive little annoyances stand (or fly) in your way, bent on doing the same to you. All's fair in love and war, after all.



There's no love lost here as you guide your rocket copter armed with interceptor rockets and plasma bombs through the Draconis and Crystalline caves and the fort itself. You'll need practised skill with a joystick to manage this once you get inside the caves and this is more complicated than it sounds. The programmers have added numerous variables such as fuel levels, prisoners that need rescuing and landing pads that require your attention. A Novatron allows you to see some items in the distance so you can prepare yourself, but surprises await the helicopter nevertheless.

Once you've mastered the initial level, you can always adjust gravity, skill and your number of pilots to make it a greater challenge. Other than some jerky scrolling, the actions of the copter are quite good and enemy tanks on the ground are quite well defined. Action in the caves will test you a bit more but practice helps. Nothing amazingly new in Fort Apocalypse, but it's more than the average zap-em game.

Title: Fort Apocalypse
Programmers: Steve Hales and Joe Vierra
Company: Synsoft, US Gold Ltd, Unit 10, The Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Tel: 021-359 3020
Hardware: 64, cassette unit or disk drive, joystick essential
Type of game: Arcade
Description: Fly helicopter thorugh maze of caves and into Fort Apocalypse to rescue friends inside
Fast loader: Novaload
Graphics: ***
Sound: ***
Playability: ***
CCI Rating: ***
Price: £9.95 (cassette), £14.95 (disk)

RAID OVER MOSCOW

Nuclear war is no subject for beginners and neither is Raid Over Moscow.

The daunting scenario of a nuclear missile attack is the premise of this game that simply reeks of American superiority from the US national anthem and red/white/blue banner that introduce US Gold games to the subject itself.

As a US commando, your mission is to destroy Soviet nuclear launch sites and stop a nuclear attack by destroying the Soviet Defence Centre. All of this is a good challenge, though the subject may not be a gaming one.

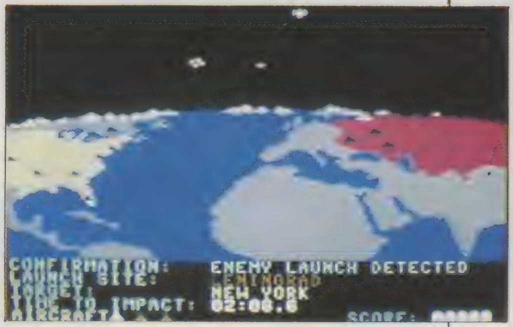
The catch is that you first have to get your fighter planes out of the space station hanger, a seemingly basic task but made much less so by the difficulty. The directions tell you to push left or right on the joystick "thus controlling the direction that you are facing" — but not, apparently, the direction you are moving.

There are other gaps of logic in Raid Over Moscow. Once you get your man to the Soviet Defence Centre, you huddle in a convenient trench behind a conveniently low wall conveniently directly in front of the Centre. Come on! Just how cushy do you think the Soviets would make this? If they have soldiers on the high walls to the side of the Defence Centre, why not on a high wall in front?

Well, never mind. The story line is quite complex, though the blunt distinction of Americans as good guys and Soviets as bad guys doesn't exactly encourage detente.

Okay, so skip the ethics and work on destruction and Raid Over Moscow is an excellent arcade spree. For the more experienced gamester, it will bring hours of fun and challenge and the fact that it requires practice is probably one of its good points.

Another is the graphics, quite detailed and vivid. They include a world overview on one screen which immediately indicates when and where a missile has been launched, its target and time to impact. Sound is very good with the most interesting being the revving of the fighter engines and the US commando's footsteps.



Pause, demo and abort game functions are additional icing on the cake. So don't let our little picks discourage you if you're a games fanatic. Even we admit that once you get beyond the hanger, there is quite a game awaiting you.

Title: Raid Over Moscow
Programmer: Access Software
Company: U.S. Gold Ltd, Unit 10, the Parkway Industrial Centre, Heneage Street, Birmingham B7 4LY. Tel: 021-359 3020
Hardware: 64, cassette unit or disk drive, joystick essential
Type of game: Arcade
Description: Destroy Soviet nuclear missile launch site before missiles hit U.S. targets
Fast loader: Novaload
Graphics: *****
Sound: *****
Playability: ****
CCI Rating: ****
Price: £9.95 (cassette), £12.95 (disk)

THE PETTIGREW CHRONICLES

Slipping easily into the role of secret agent Rupert James Pettigrew is one thing after you find his diary in a burned out house. Carrying out his task is quite another.

Even if you manage this part of Pettigrew Chronicles, there are three more to tackle,

Chapter one, for example, is entitled The Searching and requires the player to find and rescue five secret agents in varioius locations throughout Britain. The only help given is a paltry £500 budget, a list of locations and a map along with a hint as to which agent is closest to you.

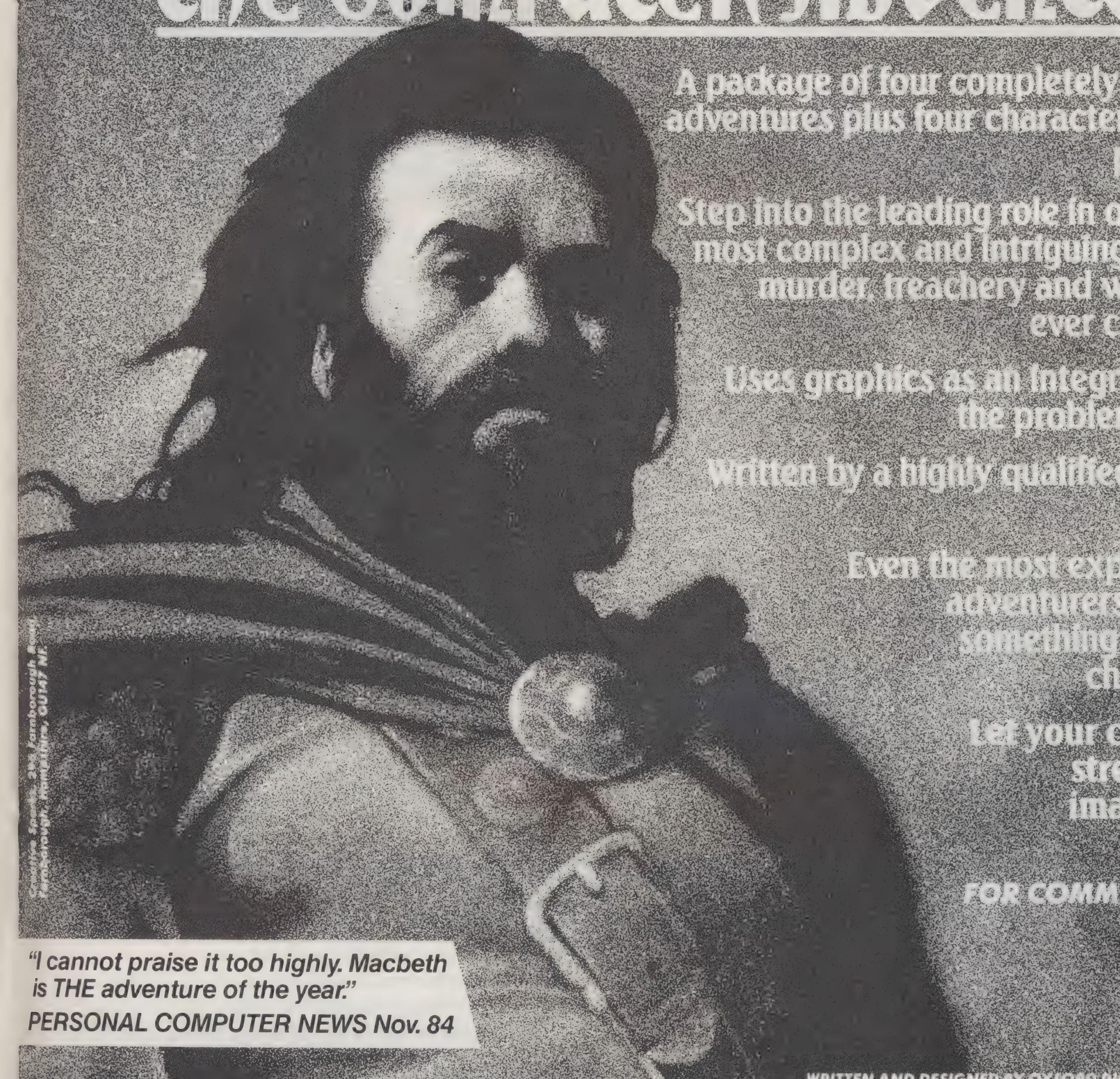
In this adventure, moving to a specific object such as a nightclub is reasonably doable. Moving to a new location is not, though you can choose whether to go by air, water or hitching a ride. In addition, you are constantly aware, after a few tries, that death by unorthodox means almost always lurks waiting for you to make one silly move. Part of the problem is the limiting two-word commands that don't allow for oddities like compound words. Another hitch is the incomplete instructions.

The difficulty of each chapter would be daunting to any novice adventurer. Patience and a good imagination certainly are virtues in Pettigrew Chronicles for it does not offer fun without effort.

While the game's reactions to player commands are yawningly slow, instructions and occasional comments flash much too

MACBETH

THE COMPUTER ADVENTURE



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quickly over a horizontal band along the top of the frame and cannot be retrieved.

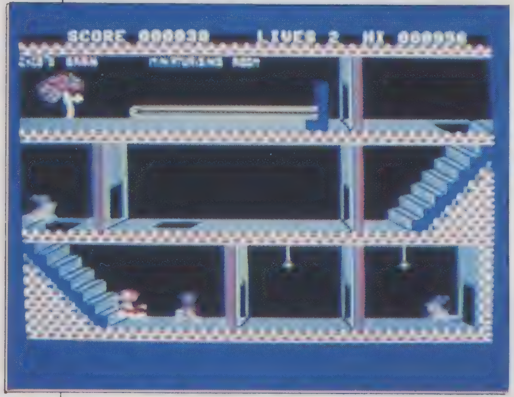
The low price for four adventures on two cassettes, however, is one advantage and you might want to make a party of this one. Two or more heads must be better than one.

Title: The Pettigrew Chronicles
Programmers: Stephen Mattz and Keith Green
Company: Shards Software, Suite G, Roycraft House, Linton Road, Barking, Essex. Tel: 01-591 7666
Hardware: 64, cassette unit
Type of game: Text adventure
Description: As secret agent, Pettigrew must complete various challenges in each of four adventures
Fast loader: Novaload
Graphics: **
Sound: N/A
Playability: ***
CCI Rating: ***
Price: £9.95 (cassette)

MIND CONTROL

Since when is high quality defined by difficulty?

That is an issue that comes to mind with Mind Control by Mastertronic in which the player must survive the "aggressive patients" in a hospital in order to even begin his mission — to kill an indestructible alien called Zyco who has taken over planet earth. Once you get into the miniaturisation room, you shrink yourself in order to enter Zyco's brain and destroy the nerve center before you expand to normal size once again.



It is one thing to make a game challenging but quite another to make it impossible or quite nearly so that you want to give up in frustration and exhaustion, not to mention fury, before you've even started. Perhaps the idea was to keep players' interest as long as possible but such difficulty defeats that purpose.

Several of us at CCI tried our hands at Mind Control to little avail. No one could ward off the patients — mainly because the game won't let you — long enough to reach the miniaturisation room and the brain interior.

As far as we could see the graphics are excellent, much better than anything we would have expected from a budget-priced game. Mind Control offers detailed, clearly drawn characters and lively, though deadly, animation in the patients armed with wheelchairs, clubs and personality problems. Sound effects are a bit stilted but suffice.

Our main objection was not having a way to fight off the nasty hospital residents, eg sending the wheelchair sprawling or hauling in a swipe here and there. Pity. It would have been so wicked!

Title: Mind Control
Programmers: Richard and David Darling
Company: Mastertronic Ltd, Park Lorne, 111 Park Road, London NW8 7JL. Tel: 01-486 3478
Hardware: 64, cassette or disk drive, joystick optional
Type of game: Arcade
Description: Reach and destroy nerve center of alien's brain before time runs out
Fast loader: None
Graphics: ****
Sound: ***
Playability: **
CCI Rating: ***
Price: £1.99 (cassette), £5.99 (disk)

FRENZY

Reminiscences of a line-based game from Supersoft called Stix come to mind with the latest offering from Micro Power, Frenzy.

Little Leptons squiggle and squirm with abandon about the screen, which in this case is a scientific laboratory. The Leptons are deadly sub-atomic particles that have escaped and must be recaptured by a robot craft before the time limit runs out.

The player operates the little craft trailing a line behind it. You can trap the Lepton by capturing it within a filled-in area created when your line reaches another border. But if the Lepton comes in contact with your line first, you're done for. The game allows two speeds of movement, the slower one giving more points. At higher levels of play, you also must contend with the Chasers — up to five — pursuing you.

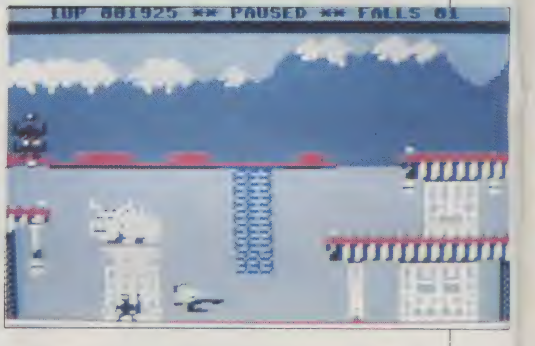
The introductory music doesn't set the mood for the lively chase, sounding more like a funeral march or church organ music, but that is a minor gripe. We applaud the inclusion of stop, pause and on-off sound functions that make starting out more pleasant.

Frenzy presents an interesting challenge and, since one cannot retract a line once drawn, requires considerable forethought and strategy about how a certain closed-in area will affect movement of the Lepton.

Title: Frenzy
Programmer: Nick Hallas
Company: Micro Power Ltd, Sheepscar House, Sheepscar Street South, Leeds LS7 1AD. Tel: 0532 434006
Hardware: 64, cassette unit or disk drive, joystick optional
Type of game: Arcade
Description: Trap escaped Leptons within borders drawn with lines streaming from robot craft
Fast loader: None
Graphics: ***
Sound: **
Playability: ****
CCI Rating: ***
Price: £6.95 (cassette), £9.95 (disk)

BRUCE LEE

US Gold touts American patriotism like Ronald Reagan. Never mind the fact that Bruce Lee actually concerns a traditionally far eastern subject — karate and is set in Japan.



Nevertheless, US Gold insists on playing that penetrating American national anthem, The Star Spangled Banner, to present yet another piece of "All American Software". But that is one of the few gripes this game prompts.

Detailed graphic features include snow-covered peaks on mountains in the background and other touches that help set the scene effectively. Animation such as the character's running and karate kicks and chops is excellent and accompanying sound effects fit in well.

Bruce Lee in this case is a rather endearing chap, wielding his "deadly weapons" in the ready position and squat against any oncoming threats such as a ninja with his bokken stick or the horrific Green Yamo. The karate master's goal is to find the wizard within a fortress of many rooms and, once you get there, you must kill him to obtain his wealth and the secrets of immortality.

Initial screens are interesting and encouraging but the challenge heightens when the Orient goes high-tech, eg electrical beams, pan lights and exploding bushes (what??) to supplement the ninja and Yamo. In addition to pause and quit game features, Bruce Lee allows one or two players in various combinations of roles.

Title: Bruce Lee
Programmer: Datasoft Software
Company: US Gold Ltd, Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY4 9AH. Tel: 021-359 3020
Hardware: 64, cassette unit or disk drive, joystick essential
Type of game: Arcade
Description: Chop and kick your way through rooms in a fortress to reach the wizard and obtain his wealth
Fast loader: Novaload
Graphics: *****
Sound: ****
Playability: ****
CCI Rating: *****
Price: £9.95 (cassette), £14.95 (disk)

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CLIFFHANGER

"The way that both characters act as if in a cartoon is superb...all my dreams have come true... graphics and animation are excellent" (PCGames). "You'll either find it irritating or sublime, depending on how you feel about Roadrunner cartoons." (PopCompWkly). NEW GENERATION. STICK OR KEYS. **CASSETTE £7.95**

GHOSTBUSTERS

"A terrific game.... extremely addictive and great fun to play" (C&VGames). "The speech synthesis is very good indeed and the tune is really catchy... THE GAME IS REALLY JUST AS GOOD AS THE FILM" (PopCompWkly). "It may be the cheer of the year.... fortunately it lives up to its hyping." (CommComp). ACTIVISION. STICK NEEDED. **CASSETTE £11.00**

COMBAT LYNX

"Brilliant graphics, outstanding simulation, an excellent game" (ZX Comp). "The 3D graphics are quite different to anything seen before on any micro... hills, valleys and fields move towards you in an astonishingly convincing way" (PCGames). DURRELL. STICK OR KEYS. **CASSETTE £8.95**

INTERNATIONAL FOOTBALL

This football-playing game is one of the most highly-praised of all Commodore programs. Sensational 3D graphics and 9 skill levels. For 1 or 2 players. COMMODORE STICKS NEEDED. **ROM £15.00**

MACBETH

"A SUPERB NEW ADVENTURE..... oozes atmosphere and is totally enthralling... a whole heap of material for your money, and it's all high quality, make no mistake. I cannot praise it too highly. Macbeth is THE adventure of the year" (PersCompNews). CREATIVE SPARKS. **CASSETTE £14.95**

PSI WARRIOR

First Beyond game for the C64! As usual with Beyond, the graphics are fantastic and it's a totally original game. As the Psi-Warrior, you ride your hover plane (like a hovering skateboard) through the hi-tech 3D silo as you fight your way down towards The Source. BEYOND. STICK OR KEYS. **CASSETTE £9.95**

ZAXXON

"Quite simply, the best shoot-em-up for the C64" (CommUser). "If you want the genuine article, this is the one to go for." (CommHoriz). "The 3D graphics are excellent... all that a good arcade game should be... very classy" (HomeCompWkly). **US GOLD. STICK NEEDED. CASSETTE £7.95 DISK £14.95**

ERIK THE VIKING

This graphic adventure is based on 'The Saga of Erik the Viking' by TERRY JONES. The accompanying 24-page manual contains extracts from the book and these hold clues which will help you in the adventure. As Erik the Viking, you travel through over 200 locations in search of the evil Dogfighters who have kidnapped your family. MOSAIC. NO STICK. **CASSETTE £9.95**

BOULDER DASH

"A real winner.... the graphics are first class and the animation and movement of the rocks are postively Newtonian! This game is in a class of its own.... A must for your games collection (HomeCompWkly). STATESOFT. STICK NEEDED. **CASSETTE £8.95 DISK £10.95**

EUREKA!

"Animated graphics and video-style split-screen techniques make EUREKA a visually interesting game as well as an entertaining adventure" (C&VGames). "With or without prizes , this package has got to be terrific value... the music and sound effects are spectacular" (C&VGames). DOMARK. STICK NEEDED. **CASSETTE £14.95 DISK £16.95**

SYSTEM 15000

"An absolutely wonderful idea... artificial hacking! System 15000 closely mimics a vast number of different databases and you have to hack your way around discovering passwords (PopCompWkly). "I recommend you play this game if you can. It could become a cult game in years to come (YrComm). CRAIG. **CASSETTE £12.95**

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EXCLUSIVE

BC'S QUEST FOR TIRES

If a picture is worth a thousand words, the expressions on this character's face would buy a gold mine.

The popular comic strip character makes this new game from Software Projects an absolute delight to play while presenting a hefty challenge at the same time. Quest For Tires begins with the character, Thor, bumpily riding along on his stone wheel trying to avoid rocks, overhanging tree limbs and logs in his path and nimbly hopping from turtle back to turtle back over a pond.

Birds flying overhead keep a wary eye out as Thor zips by, his wind-blown hair flying behind him. The trek isn't always successful, of course, and when BC tumbles to the ground the stars float above his head in the true cartoon tradition.

Smooth scrolling to the left, blades on the grass and leaves on trees are other clever attributes rarely seen in arcade game graphics. Furthermore, when you lose one of your lives you aren't forced to begin the game all over again, though you are set back some distance.

Title: BC's Quest For Tires
Programmer: Sierra-on-Line
Company: Software Projects Ltd, Bearbrand Complex, Allerton Road, Woolton, Liverpool L25 7SF. Tel: 051-428 9393
Hardware: 64, cassette unit or disk drive, joystick essential
Type of game: Arcade
Description: Guide Thor safely through the land of the stone age on his single wheel
Fast loader: Burner
Graphics: *****
Sound: ****
Playability: *****
CCI Rating: *****
Price: £9.95 (cassette), (disk available soon)

This review was sent to us by a reader

ENCOUNTER

Exploding spaceships and homing missiles are just two of the ingredients that help to make Encounter one of the best games available for the 64.

Encounter is a 3D combat simulation in which you must track and destroy a number of cunning aliens, whilst manoeuvring through a barren landscape with only towering cylinders and alien spaceships for company. After destroying the aliens, a portal opens and into the void you must go! Successfully steering through a hailstorm of meteors takes you to the next of the eight landscapes featured.

The cockpit of your craft is fitted with a radar, and three sets of lights to warn of any impending dangers. The graphics are superb, and the accompanying sonics are, to quote a phrase, 'Lound and' clear'.

With fast loading and a screen picture whilst loading, this is a game that should be encountered as soon as possible.

Title: Encounter
Programmer: Paul Woakes
Company: Novagen Software, 213 Broad Street, Birmingham. Tel: 021-643 9100
Hardware: 64, cassette player or disk drive, joystick
Type of game: Arcade
Description: Travel the eight landscapes by destroying the alien spaceships and riding the meteor storm to the next level
Fast loader: Novaload
Graphics: ****
Sound: ***
Playability: *****
Readers' Rating: *****
Price: £9.95 (cassette), £12.95 disk
Reviewer: Cpl. T P Ruckwood of RAF Bishops Court, N. Ireland

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Our review panel will review one game a month — if you're not on the panel, don't give up. We will still publish readers' reviews on a regular basis and will elect another panel in six months time.

SPECIAL DELIVERY

Christmas may be over, but a Santa out of season at least is a novelty. Special Delivery is a fun idea and a good basic arcade game no matter what the season.

Having awoken late on Christmas morning, Santa has only five hours to deliver his presents and you have to guide him and his sleigh safely through the air littered with dangerous clouds and imposing mountain peaks. On his way to the homes, though, he still has some presents to pick up.

Once he gathers them and makes his way safely to a rooftop, he still faces the obstacles of fireballs and snowballs inside the chimney. Finally, he must make sure the children don't see him, for that would spoil everything.

Time is of the essence in Special Delivery (don't confuse this with the GPO) and the slightest, indiscriminate bump or jolt can throw you off enough to snatch an hour. Graphics and sound aren't spectacular; smoke coming from chimneys looks more like flames and it would have been nice to see all nine of Santa's reindeer instead of just half of one. Animation lacks a bit of spark as well, though Santa's climbing actions are well done.

But Special Delivery is a good, simple game that still manages to keep your attention and challenges the player enough to make you try "just one more time".

Title: Special Delivery
Programmer: Dalali Software
Company: Creative Sparks Software, Thomson House, 296 Farnborough Road, Farnborough, Hants GU14 7NU. Tel: 0252 543333
Type of game: Arcade
Description: Gather Christmas presents and deliver them to the houses before time runs out
Fast loader: Yes
Graphis: ***
Sound: **
Playability: ***
CCI Rating: ***
Price: £7.95 (cassette)

EXCLUSIVE

JUICE

This little android doesn't look much like his namesake, Thomas, but the idea is there and provides imaginative fun doing something most of us know little about — building a circuit board.

The player in Juice, the newest American import from System 3 Software, controls Edison — not Thomas but the frustrated android who simply wants to get on with his job. But he is hindered by little creatures of your choosing. The available array includes Nohms, a "negative influence," Flash, the lightning bolt and Killerwatt who unscrupulously tries to "fry poor Edison's brains."

Juice is a slinky-like game but expands on that theme by offering slight variations as the level of play changes. Colourful graphics include transporter pads that take Edison to the other side of the circuit board. These "Star Trek"-like devices go fuzzy when the transporter beam dematerialises Edison and then makes him re-materialise on the other side. Edison's jumping from one square to another on the board is quite good as well.

Sound effects consist of a few beeps and bleeps, but perhaps could have been more elaborate to spice up the action.

A praiseworthy feature for beginners and pros alike is the ability to play without characters so you can complete your board's connections without annoying hinderances. Furthermore, as you clear each level you must find an invisible trace on the circuit board from the top left to bottom right of the screen and you're moving against a time limit.

Title: Juice
Programmer: Arti Haroutunian
Company: System 3 Software, South Bank House, Black Prince Road, London SE11. Tel: 01-582 7522
Hardware: 64, cassette unit, joystick essential
Type of game: Arcade
Description: Edison the android must avoid charging creatures to complete his circuit board
Fast loader: Novaload
Graphics: ****
Sound: ***
Playability: ****
CCI Rating: ****
Price: £7.95 (cassette)

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Through the corners, up the hills, into the ruts and down the straights you manoeuvre for position and try to beat the clock.
Stay ahead if you can. But whatever you do, stay on course.
If you don't, one of two things will happen.
You'll slow down and lose valuable seconds getting back into the race. Or worse, you'll end up on the seat of your pants.
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Your agents risked their lives to find the enemy's secret headquarters.
Now you're risking yours to destroy it.
And they know you're coming.
Time is short, so you'll have to fly. But fly too fast, and you'll squander your precious fuel supply.
Needless to say, they don't issue parachutes on missions like this.
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The attacks come from every direction.
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Edison, the kinetic android, leads a frustrating life.
All he really wants to do is build his circuit boards and go with the flow. But things keep getting in the way.
Nohms — a negative influence — bug him regularly. They're harmless, but only from a distance.
Flash, the lightning bolt, disconnects everything in his path. Which can be frustrating after a hard day on the circuit.
And the cunning Killerwatt is out to fry poor Edison's brains.
But our hero simply solders on.
Juice! is the ultimate current event. You'll get a charge out of it. And a few jolts, too!

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Meet Mr Marvel himself!

Sue Pearce talks to Scott Adams, creator of the Marvel characters, and to Adventure International, UK manufacturers of his popular computer games

ADVENTURE INTERNATIONAL

The UK manufacturers of Scott Adams' games started life as Calisto, a distributor of American software including the products of Adventure International.

Pat Woodroffe, a director of Adventure International, explains: "At the end of '81 we decided it would be a good thing to manufacture just one of the products, saving import costs.

"We got in touch with Scott Adams and went to Florida in 1982. There we negotiated a deal with Scott regarding the manufacture of his products solely in the UK."

This time last year, Adventure International realised the need for conversions of games for the most popular computers in the UK (which enabled all you 64 owners to vent your frustration through the guise of The Hulk!).

After the Las Vegas show in January '84, Adventure International was awarded a licence agreement with Marvel to manufacture games based on the Marvel characters. Since then the company has also negotiated the manufacturing rights for Europe.

Scott Adams' name certainly aids sales of Adventure International's games. "Scott Adams adventures are so well-known," agrees Pat. "It's got to be a plus point because of all his well-known characters."

Anything that is produced by Scott in the US is manufactured by Adventure International in the UK.

"Our own products are also being developed under Adventure International's name, with Scott's blessing," says Pat. "One idea is arcade games based on Spiderman."

Although basically an adventure company, Adventure International have dabbled in arcades in the past and intend to do so in the future.

"Adventures are long lasting," comments Pat. "More so than arcades which have a life of three months at the most."

New Adventure International products to look forward to in the very near future are games based on the Fighting Fantasy book written by Steve Jackson and Ian Livingston.

SCOTT ADAMS — ADVENTURER INTERNATIONAL

Pic courtesy of Micro Adventurer

Scott Adams with two of his creations, Spiderman and The Hulk

"The world's greatest adventure writer" is an accolade often attributed to Scott Adams, creator of the Marvel characters.

Spiderman and the Incredible Hulk have adorned the bedroom walls of many a child. Marvel comics and the resulting films and TV programmes have all met with a high degree of success. The opportunity to actually control these heroic characters through computer adventure games has, not surprisingly, also been very popular.

Scott Adams is no novice when it comes to computers. He says: I've been working on computers since 1968. I started with micros in the early days when they were first around."

The Marvel characters are the basis for the first Questprobe series: around 13 adventures, each a chapter involving a different character. "I do all the scripting and programming for the major versions," explains Scott. "It's been quite an interesting challenge transferring my characters onto a computer."

In his programming role Scott has written a couple of arcade games, but adventures are his first love.

"In the early days I programmed some adventure games on the PET which were marketed by Commodore," says scott, who has watched computers becoming a lot more sophisticated over the last few years.

As the number of Scott's adventures increases, so does the level of difficulty. The results are entertaining and challenging games, well worth spending the time puzzling over.

Colossal Cuthbert

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Cuthbert Enters the Tombs of Doom
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The Cuthbert cult continues with colossal capers in the latest escapade from Microdeal. It's a five star game all the way.

The challenge consists of over 200 chambers! How do they do it? Chambers are littered with keys, locks, ghostly ghouls, beastly bats, sadistic saxaphones — yes, saxaphones — sworded spheres, stekevab fiends, transportation chambers and various treasures.

Then there are lamps to be filled to give temporary immunity from the nasties and extra lives to be won and lost. It is quite mind-boggling.

With the cassette comes a join the Cuthbert Club registration, a 16 page instruction booklet — sorry manuscript — autographed poster application with a meet-Cuthbert competition and a key fob. It's superb packaging to go with an excellent piece of software.

The early stages start easily, but the going soon starts to get tough as Oxygen shortages begin to penalise any delay. What's more, negotiating a room once might not be enough, you may have to go back more than once to pick up more keys. But that's enough from me, you'll discover the rest when you buy it. **B.J.**

instructions	92%
playability	95%
graphics	92%
value for money	96%

★ ★ ★ ★ ★

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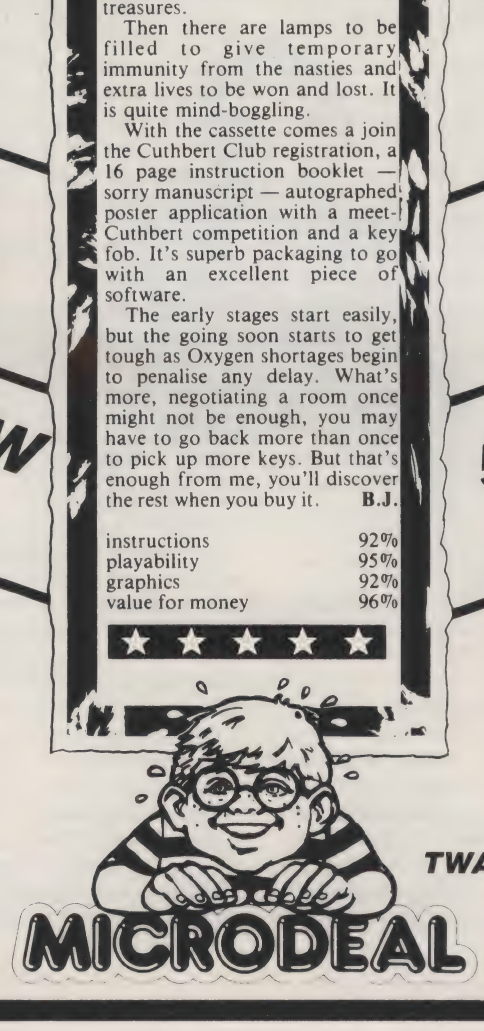

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Defining '85 "A year of flexibility"

If reality was "The Word" for 1984 in the computer industry, flexibility may be it for '85. Viola Gienger continues her look at the business, talking to some of the leaders in software and hardware. Last month, they told us that 1984 forced them to face some harsh realities. Now they reveal some forthcoming changes — both chosen and forced — in 1985.

The boom is over and that newfangled machine that captured the minds and purses of millions not so long ago is settling into its comfortable niche in the home — the computer right along with your refrigerator and television set.

At least that is the prediction from many of those who ought to know, the ones whose livelihoods depend on the public's continuing infatuation with computers. That first roar of the flame has died down to a slower, but steady, flicker, making software and hardware companies change tactics for results that don't sweep the market as much as keep a steady, loyal following.

"The home computer market is not going to carry on growing indefinitely and in 1985, the onus will be on us as manufacturers to act creatively and give people new reasons to buy," says Howard Stanworth, general manager of Commodore UK.

Led by Commodore's two recent machines, the C16 and Plus/4 and the promised PC and Z8000, the Commodore-related market will try to keep the ball rolling. In any case, personal computers certainly are not being written off as a fad.

— 1985 —

"I think people will always have computers around as much as they have record players," says Llamasoft owner and programmer Jeff Minter, "The games market is shrinking, but there always will be a bunch of enthusiasts that will keep on playing."

Others agree, including sales director Christine Laugharne of Melbourne House who says, "The young games playing market might get smaller — the 10-15 year olds. But the enthusiasts market —those who know a lot about computers and experiment with them — will always be around."

Precision Software's Nigel Lavit-Turner says, "I think it's part of life."

And Mark Eyles of Quicksilva sees the computer playing a more practical role in the home in order to survive. "They're definitely not a fad," he says. "But the way people use them as a seasonal change, it would be difficult for me to guess."

— 1985 —

Greater sophistication seems to be the direction for the home computer market, a comment supported by evidence of sales by Rumbelows, one of the major retail chains in the UK with 400 electrical retail and TV/video rental shops.

"There is a very clear movement in the home computer market this Autumn with customers moving away from the more basic models, and upgrading to second generation products with additional capacity," says chief executive David Johnson.

Now offering a range of 11 models, Rumbelows says it has "included a wide selection of peripherals to cater for an increasingly sophisticated market.

The average spent on a computer rose from under £150 in 1983 to £300 or more in 1984, says Johnson.

Activision's Geoffrey Heath also takes an optimistic tone. The company is relatively new to the computer games market and Heath, UK managing director, says, "I don't know whether we've got to the boom yet."

— 1985 —

"It's in the home with the television and the washing machine. The computer kids today will be computer parents tomorrow," he says. "I just think one has to be very careful with using words like boom."

The result of the settling is a turn by many companies to more serious software and to better quality that will challenge and keep the interest of an increasingly choosy marketplace. Better graphics, elaborate text, extended uses — all in demand more and more by users who've skimmed their computers' novelties and now long for something more meaningful, practical, useful.

"The future of the home market is definitely in the more sophisticated models," says Johnson. "The public know that the combination of computer and TV set will eventually be the focal point for so many areas of their lives — shopping, education, leisure, home security and home budgetting — and I believe that they are determined that they will make this particular technology really work for them."

— 1985 —

Audiogenic's Martin Maynard sees local, national and international networks as an exciting new frontier. "It could be the year for communications," he says. Commodore UK believes communications capability is a key reason people will keep buying.

"In fact, it is probably the single most important factor in the future of home computing," Stanworth says.

Another key to success involves that irritating catch-phrase "user friendly." Complex programming and keyboard gymnastics may amuse and entice computer buffs, but the average user doesn't want to know every nook and cranny of the printed circuit board just to balance a chequebook.

"We think people should bring out hardware that isn't too complicated," says Peter Calver of Supersoft. "The nice thing about small computers is that they're easy to understand."

Software houses also are making plans to move into areas they perhaps haven't considered before — from games to joysticks, from accountancy packages to communications and so forth. The contracting market in one area is forcing the companies to stick their hands in elsewhere.

— 1985 —

But they won't be able to slack off anywhere. New products will have to be top notch to compete and after-sale service must be aimed at making buyers happy, loyal and vocal in their praise.

"I can't quite see a 1985 as good as 1984," says Frank Coward, general manager of Stack Computers, who forecasts the number of computer, hardware and software dealers will plummet over the next year, reducing by more than one half. But Coward expects the decline to halt at around 2,000 dealers who will service those still interested.

At Commodore, Howard Stanworth sees a similar trend. "In 1985 the shakeout which has already begun in the industry will intensify and we're going to see a lot of casualties," he says. "The companies which survive will need to be more aggressive and more flexible than ever before."

Audiogenic's Martin Maynard is a bit more blunt: "I think 1985 will see the make or break of the home computer market."

The companies that will be making or breaking also talked about their own roles within the industry, though the inevitable secrecy kept many from naming specific products. Nevertheless, each software and hardware "house" is gearing up for the new year and long ago decided strategies to keep them among the success stories.

ACTIVISION

"I don't see us getting really highbrow," says UK managing director Geoffrey Heath, who hopes to successfully keep his company on its current track of quality games.

Geoffrey Heath

Heath says Activision intends to stick to the leisure end of the software industry and has no plans to advance on the business side of the computer. Any software the company does introduce will have to be easy to use, he says.

"People will want to have fun with it," he says. "I think people want to enjoy it, not sit there and work and think 'I don't really want to do this'."

With one to two titles released each month and more in early '85, Activision certainly won't limit itself. "We will widen what we do," Heath says.

AUDIOGENIC

As a thrust in the direction of communications, Audiogenic will be introducing Well Talk, a communications package, early in 1985, says managing director Martin Maynard.

Home productivity packages also will be among the new offerings from this company, including a database, spreadsheet, wordprocessors and other variations. And increasing demand for peripherals may make up a wider avenue, "quite possibly" the future wing for Audiogenic, which already entered that area in 1984.

"I'm looking for a robotic arm to be used in the home," he says.

BUBBLE BUS

Sandy Marchant says his company is going straight where the heart is — the home.

Diaries and accounts packages are among the possibilities, but Marchant would first want users to have access to blank cartridges that eliminate the lengthy loading time of disks. He expects Bubble Bus to introduce more products next year, particularly for home use.

"Parents buy computers for their kids at Christmas and a few months later they ask, 'Oh, can't you do anything apart from games on it?'"

COMMODORE

UK general manager Howard Stanworth is confident that Commodore will be among the survivors despite the lukewarm reception so far given to the newest machines, C16 and Plus/4.

"No-one can afford to be complacent in a market as volatile as ours, but we have every confidence that by being creative and adaptable, Commodore will be even stronger than every next year."

So Commodore has big plans for the hardware and software markets, he says. "We're looking forward to further broadening our hardware range, with the launch of the new Commodore PC and Z8000 business computers and we'll also be aiming squarely at taking a sizeable slice of the software market."

HANDIC

Maker of the popular CalcResult package, Handic Software is planning to bring out a database during the first quarter of 1985. Though games will continue to be in demand, managing director Terry Taylor says more will take the form of ROM cartridges and disks, rather than the traditional cassette.

And with the market "getting more selective," Handic will also try its talents in the expanding communications field. "We're working to get a modem approved," Taylor says.

PREDICTIONS

LLAMASOFT

Jeff Minter isn't reaching for the stars in 1985.

"I have no ambitions to get any bigger," he told CCI. "That would be too much trouble."

Minter goes to a lot of trouble for his games clientele, however, witnessed by the devoted following he developed with healthy sales for Llamasoft last year. "I'll stick to games and entertainment," he says. "I won't be doing anything too serious with it."

Minter would like to see more sprites and greater flexibility from hardware, but in his own business, he'll continue designing games for the loyal gamester.

MELBOURNE HOUSE

Sales director Christine Laugharne says Melbourne House will be focusing some of its energies on software for Commodore's newly released C16, expected to do well during the Christmas season.

"I think it will do very well," she says. "I think it will substitute quite well for the VIC 20."

Books and young children's software will be two of the priorities among a range of learning products. "We do quite well with books like disassembling your ROM and ones like that," Laugharne says. "I don't think that end of the market will shrink at all."

PRECISION

The United States will continue to be a key market for UK software house Precision, according to finance director Nigel Lavit-Turner, whose company secured millions of dollars in contracts last year for its Superbase package, now translated into eight languages.

The greater demand there than in Britain for superior quality will mould the company's offerings for 1985, including tutorial audio-learning cassettes. "You'll be able to listen to instructions so you don't have to peer at a manual," he says. "I think it's important that people feel they've achieved something in half a day."

The word processor Easyscript will be extended to machines other than Commodore, he says, and Precision will be adding appication templates to its database.

QUICKSILVA

"We'll be doing everything we have been doing but better!"

That, in a nutshell, is the plan for Quicksilva in 1985, according to creative design executive Mark Eyles. "As far as the actual contents of products, it won't change much," he says. "We'll be working on character based games, but at the same time, that's something that always goes on."

Eyles says Quicksilva, which only began supporting Commodore machines with software about a year ago, will continue to design for the Commodore, particularly the 64 "because it's a big machine."

Pearl Wellard and Peter Calver

SUPERSOFT

Along with repackaging for more serious software, Supersoft will be another of the companies turning to the C16 for new ideas.

Co-founder Peter Calver says, "We think the Commodore 16 is an excellent machine and we think it's going to be successful. I think it's going to overshadow the Plus/4."

Calver says he is impressed by the 16's keyboard, high resolution, powerful basic and colour and sound capabilities and expects consumers to turn to it for business as well as first-time buyer use.

To prepare for that, Supersoft will introduce its Suite 16 range of software including a word processor with two-three pages of text and a spreadsheet. And all will be developed with simplicity and a low selling price in mind, he says.

ROMIK

Managing director Mike Barton says Romik is looking in the direction of the C16 for a sign of where the company should go in 1985.

"We're putting a lot of hope behind it," he says. Led by the November release of Pottit, a full video simulation game, Romik is planning for two or three more titles in the near future for the C16.

Three games later in the year are expected to be "significantly ahead of the market" in terms of quality and technology. "We're looking at the development of what some people have termed mega-games," he says. "They will be three games that will absolutely leave the market standing."

Romik also has been approached by several companies to develop more serious software, but Barton says even if those plans come to fruition, the products likely will be marketed by other firms though Romik will be responsible for design.

"They are talking about far more serious applications at far higher prices than we would ever dream of," says Barton, who would not elaborate on specifics of the yet-to-be-decided deals.

STACK

Liverpool based Stack is planning four new products in the first quarter of this year and will consider moving into markets using micro technology, says general manager Frank Coward.

One of those markets includes aids to the handicapped, an area Stack has dabbled in on a small scale in the past. Programmers' aids such as a light pen and other alternatives to the keyboard are in the works "to make computers more user friendly," Coward says.

He says the company would also like to develop a package to allow the computer user to build his own games in modular form, selecting sprites and the conditions and creating from there.

VIRGIN

As for all software companies, it will be another difficult one for Virgin managing director Nick Alexander, but the range of new computers may give software houses something to live for.

Virgin, for example, is focusing on more sophisticated software.

Contradicting some of the excitement welling up in the industry for the 16, Alexander says the 16 will not be one of the points of emphasis at Virgin.

"We're not really very excited about the Plus/4 or the 16, particularly the 16. I don't see why anyone is bothering with that."

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   - c) 1010
   - d) 956

2 Which was the first major computer manufacturer to use a floppy disk in a computer?
   - a) ICL
   - b) Commodore
   - c) Apple

3 Which of these British companies was once involved in computer manufacturing?
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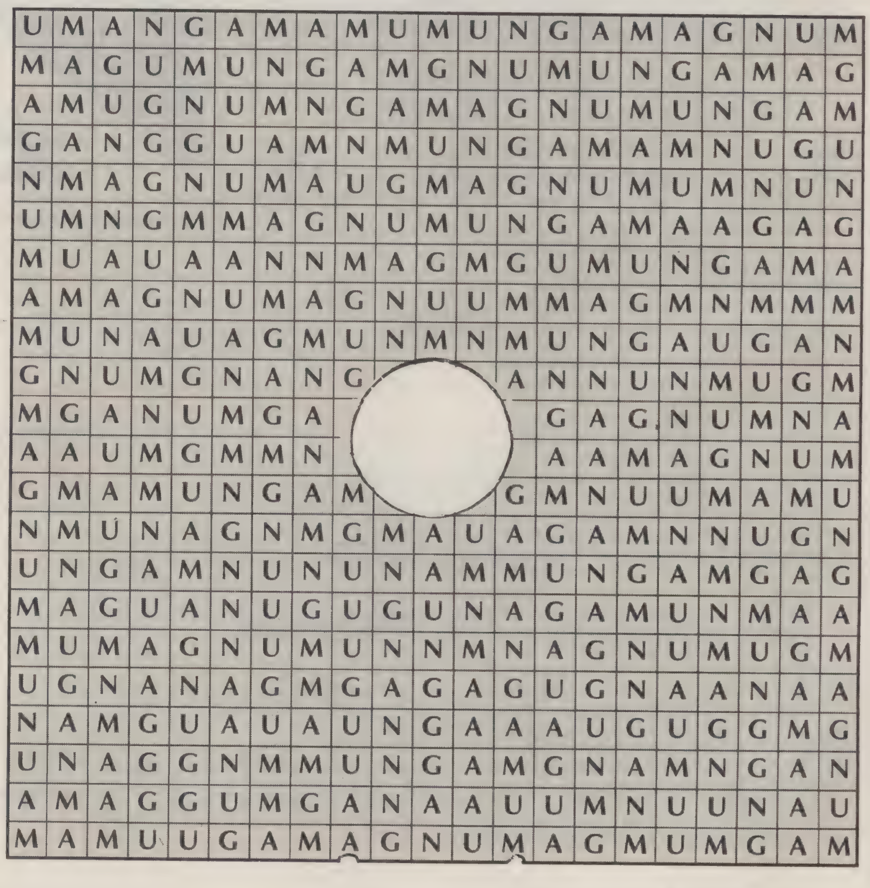
   - b) Tube Investments
   - c) British Leyland
   - d) Prudential Insurance



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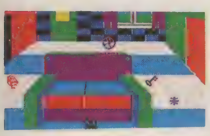

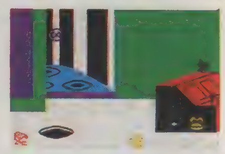

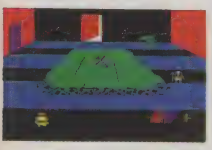

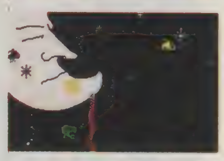

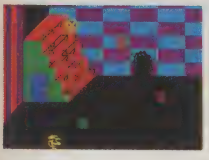

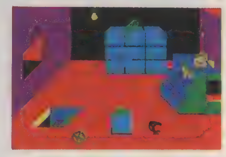

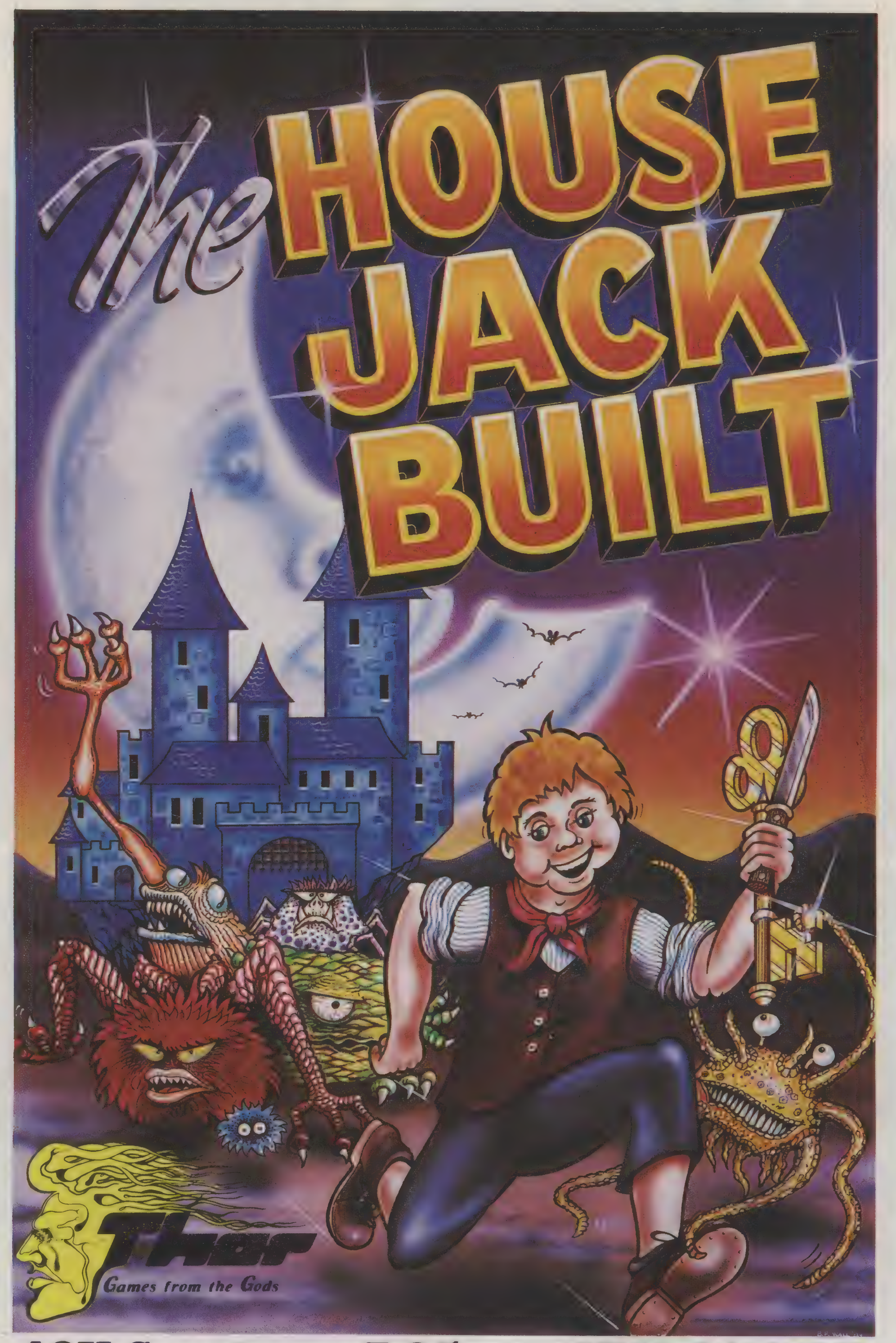

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NOTE WE HAVE MOVED TO NEW PREMISES

Learn the lingo

**Baffled by computer terminology?
Pete Gerrard translates it into English**

ACCESS
To obtain data from, or place data in, memory, either the computer's or some other peripheral's.

ADDRESS
The number associated with each memory location.

ALGORITHM
A step-by-step procedure by which instructions are given to the computer.

Alternatively refers to digital music.

ALPHAMERIC
Letter characters only.

ALPHANUMERIC
Refers to letters, numerals and symbols.

ANALOG
Method of measurement using a continuously variable physical quantity.

APL
A Programming Language used mainly in mathematics, consisting principally of symbols.

ARGUMENT
Usually used to describe the value associated with a command.

ARRAY
A linear arrangement of individual items of data, each identifiable by an index, allowing single items of data to be examined.

ARTIFICIAL INTELLIGENCE
That displayed by those who talk about it!

ASCII
American Standard Code for Information Interchange. Uses the numbers 0 to 128 to represent numbers, letters and control characters for the purpose of communication from computer to computer. Not very standard in practice.

ASSEMBLER
A program that converts machine language to assembly language.

ASSEMBLY LANGUAGE
Similar to machine language, but since it consists of mnemonics and symbols it's a lot easier to understand.

ATTACK
The rate at which a musical note reaches peak volume.

BACKUP COPY
To make a duplicate of a file.

BASIC
Beginners All-purpose Symbolic Instruction Code. A conversational computer language that relies on words rather than symbols to program a computer. Usually used on home microcomputers.

BATCH
Holding of jobs for processing at a later time. As practised by many government departments.

BAUD RATE
Time it takes to reach above state.

Or, the speed of data transfer from one computer to another, in approximate bits per second.

BINARY
Numeric system using only digits 0 and 1, with each digit in a binary number representing a power of two.

BIT
A single Binary digIT, it is the smallest piece of information that a computer can hold and process.

BOARD
The large thing inside a computer that has processors, fuses, heat sinks and a maze of wires and cables soldered onto it.

BOOT
Short for bootstrap, and is the process either a) when you load an operating system into the computer, or b) when one small program loads one extremely large one.

BRANCH
Point at which execution of a program is transferred from the main logic flow to another part of the program. Usually used with subroutines.

BUFFER
An area of memory where information coming into or out of a device is temporarily held.

BUG
An error in a computer program, often used to refer to errors in anything else as well.

BUZZ WORDS
Whatever saying happens to be in vogue in the computer world at the time. See artificial intelligence.

BYTE
A group of bits, usually 8 on home computers. Usually the same as the amount of room required to store a single character. Referred to in units of Ks, where 1K is equal to 1,024 (the nearest number to 1000 that is a power of 2).

CAL
Computer Assisted Learning. Computers teaching humans, as used in mainly educational areas.

CAMBRIDGE INSTITUTE OF MATHEMATICS' AXIOMS
Variables won't, Constants aren't, GOTOs don't, GOSUBs do but don't usually come back.

CENTRONICS
One of the three main types of interface.

CHARACTER
A letter, number, punctuation mark or special symbol.

CHIP
The chip of silicon from which an integrated circuit is made, but usually refers to the circuit itself.

COBOL
Common Business Oriented Language, a computer language mainly used for business applications.

COLD START
Switching the computer off and on again.

COLUMN
A vertical sequence of characters.

COMMAND
A request or instruction to the computer.

COMPATABILITY
Whether or not two or more devices can be connected together. Sometimes used to refer to humans!

COMPILER
Effectively translates a program written in the standard BASIC of a computer into a pseudo-machine code language.

COMPUTER
That which makes life much more difficult. As in driving licences, gas bills etc.

CONSTANT
A specific numeric or string value, as in A=12.2, or A$="HI THERE!"

CONTROL CHARACTER
A character with no graphic meaning, but which does signify something to the computer (e.g. cursor control characters).

TO BE CONTINUED NEXT MONTH

Help us to help you

Over the last few months CCI has undergone several changes designed to give you, the reader, more value for money. We do need to know if you like what we're doing and welcome suggestions for further improvement. Help us to help you by filling in this questionnaire. As a further incentive, we are giving away 50 FREE 12 month subscriptions for the first replies we receive. (If you already subscribe your subscription will be extended for 12 months on expiry.)

Microcomputer Ownership

1 Do you own a microcomputer?

☐ Yes
☐ No
If no go to question 9.

2 What make/model of microcomputer do you own?

Make ____
Model ____

3 Do you own any other microcomputers? If so, please list:

Make ____ Model ____
Make ____ Model ____

4 When did you purchase your microcomputer?

☐ Less than six months
☐ six months to a year
☐ More than a year ago
☐ More than two years ago

5 Where did you purchase your microcomputer?

☐ Specialist Dealer
☐ Retail Outlet eg WH Smith
☐ By Mail Order
☐ Second Hand Purchase
☐ or was it a gift?

6 Are you planning to upgrade your micro in the next:

☐ Six months
☐ Nine months
☐ 1 year
☐ Not at all

7 If so, what make/model of micro are you planning to purchase?

Make ____ Model ____

8 If you are going to upgrade your microcomputer at work, what make/model is involved?

Make ____
Model ____

Time Scale:

☐ In six months
☐ Nine months
☐ 1 year
☐ Not at all

Using a Micro

9 Where do you use a microcomputer?

☐ Home
☐ Work
☐ Both home and work
☐ A club
☐ A friend's hosue

Peripheral Ownership

10 Do you own a printer?

If no go to question 11.
If yes what make/model is it?

Make ____
Model ____

11 Are you intending to purchase a printer in the next:

☐ Six months
☐ Nine months
☐ 1 year
☐ Not at all

12 Do you own a disk based system?

Yes ____
No ____
If no go to question 14.

13 How many disks do you buy a year?

(please state) ____

14 Are you planning to buy a disk based system in the next

☐ Six months
☐ Nine months
☐ 1 year
☐ Not at all

15 What other peripherals do you own?

What peripherals are you planning to purchase?

Own Plan to Buy
☐ ☐ Plotter
☐ ☐ Monitor
☐ ☐ Light pen
☐ ☐ Joystick
☐ ☐ Mouse
☐ ☐ Graphics tablet
☐ ☐ Additional memory pack
☐ ☐ Modem
☐ ☐ Add-on board (Please specify)
☐ ☐ Other (Please specify)

16 What do you presently use your micro for?

At Work At Home
☐ ☐ Games
☐ ☐ Arcade style
☐ ☐ Adventure
☐ ☐ Strategy
☐ ☐ Simulation
☐ ☐ Education
☐ ☐ Word processing
☐ ☐ Database
☐ ☐ Accounts
☐ ☐ Stock Control
☐ ☐ Spreadsheet
☐ ☐ Home Communications/ Bulletin Boards
☐ ☐ Business Communications
☐ ☐ Mainframe Communications
☐ ☐ Programming
☐ ☐ Scientific/Engineering
☐ ☐ Applications Development: (please specify)
☐ ☐ Graphics: Please state:
  - ☐ Business
  - ☐ Home
  - ☐ Presentation

17 What software packages do you use?

Please state name of package(s) (Educational and Business Applications only)

____
____
____
____
____
____
____
____
____
____

18 Are you going to upgrade your software?

☐ Yes
☐ No

If so what kind(s) of software will you buy?
Please list in order of preference

____
____
____
____

19 How much do you spend on software a month?

☐ Under £10
☐ £11-£49
☐ £50-£99
☐ £100-£199
☐ £200-£299
☐ £300+

20 On average how much time do you spend per week using your microcomputer?

Hours (Please state)

____ Applications
____ Games
____ Arcade style
____ Adventure
____ Strategy
____ Simulation
____ Education
____ Word processing
____ Database
____ Spreadsheet
____ Accounts
____ Home Communications/ Bulletin Boards
____ Business Communications
____ Programming
____ Scientific/Engineering
____ Applications Development:
Graphics
____ Business
____ Home
____ Presentation

21 Why do you read Commodore Computing International?

Please rate the following attributes on a scale from 0-4. 0 = Little interest and 4= Strong interest.

☐ Software reviews
☐ Industry gossip
☐ Hardware reviews
☐ Program listings
☐ Features on programming
☐ Hints and Tips on programming
☐ International news
☐ Peripherals review
☐ Book reviews
☐ General features
☐ News
☐ Reputation
☐ Exclusive reports
☐ Case studies
☐ People/company profiles
☐ Games reviews
☐ Games charts
☐ Communications features
☐ Graphics features
☐ Letters
☐ Queries answered
☐ Information from adverts
☐ Readability
☐ Contents page
☐ Photography
☐ Competitions/Special Offers
☐ Illustrations
☐ Cover design
☐ Price
☐ Availability

What changes would you like to see in CCI?

____
____
____
____

22 How many computer magazines do you purchase each month?

Please state ____

Please list other computer magazines you purchase, each month, in order of preference.

1 ____
2 ____
3 ____
4 ____
5 ____

23 What computer magazines do you subscribe to? Please list

____
____
____
____
____

Personal Details

Name ____
Address ____
____
____

Age
☐ Under 12
☐ 14-19
☐ 19-25
☐ 26-35
☐ 36-45
☐ 45-65
☐ Over 65

Sex ☐ Male ☐ Female

Occupation

What is your job title? ____
What type of business or industry is your organisation engaged in?
____
Other, eg Educational Establishment
____
Student ____

Income

☐ Up to £7,500
☐ £7,500-£12,000
☐ £12,000-£20,000
☐ £20,000+

Pitfalls of Programming

Lecturer David Bowdrey offers some sound advice for the programming novice (and possibly the experienced too!)

Writing computer programs, like any other writing whether verse or prose, has its rules. Some rules, such as those of the language syntax, must not be broken. Other rules are there to keep us on the rails. Occasionally, through necessity or flash of genius, the latter group of rules may be broken. However, do so with caution, a good reason and very seldom!

What follows is a collection of the pitfalls into which a programmer may so easily stumble, interlaced with some general rules and explanatory comments. Each of the points will be dealt with in detail in later articles. You will not remember them all, but when an area of programming is proving troublesome reread them. It could prove to be an enlightening experience.

1. CODING BEFORE THINKING

Very common with home micros. A disaster for the serious programmer, this nasty habit should be broken at the earliest possible moment. With good programming, entering code (ie BASIC statements) on the computer is way down the list of activities. All programs start with an idea, but the fulfilment of the idea's potential is dependent upon the detailed planning BEFORE coding starts. Remember, Design and Documentation are essential prerequisites for a sound program.

2. MAKING ASSUMPTIONS ABOUT BOTH YOUR OWN AND THE USER'S KNOWLEDGE

When first developing an idea assume very little and research much. If there is any doubt about a detail check it out. As you write a program avoid becoming engrossed to such an extent that simple abbreviations take on meanings known only to you. Make input easy to enter, letting the computer do the computations. Make any output easy to read. Assumption that a technical term is understood by one and all can destroy the effectiveness of a program. Try to keep input formats uniform and free-form when possible. Always detail the input required and echo (display) it, especially when a default or an expansion of the input has been allowed.

3. CATERING FOR ALL THINGS AT ALL TIMES

An easy trap to fall into. In attempting to cater for all things at all times a very shallow program often results that is probably not worth the programming effort. Even with access to a very large and powerful computer, the programmer needs to clearly define the aim of the program and its bounds.

Once a program to carry out a particular activity is underway it is so easy to be drawn into extending that program to cover allied activities. The extensions appearing to be a natural part of the program because of the common ground highlighted during its development. Be cautious! Note the "improvements". Those that bear scrutiny will often be the nucleus of a program in its own right, maybe forming one of a suite of programs. Unless one is going back to redefine the original program specification, only incorporate those improvements that are specific to the original activity.

On a lower level, keep library routines specific to one area of activity. Write new routines to cover any allied areas as necessary.

4. INSUFFICIENT DOCUMENTATION

This pitfall is really the sin of ignorance. Surprisingly, some programmers do not even write the correct program title on their tape or disk casings! Good documentation, done at the right time, will save hours of programming effort. It will enable future modification and provide a worthwhile reference source for subsequent projects.

An important item of the documentation is the noting of variable names and their purpose in the program. Use variable names that have a meaning appropriate to the context in the program, or library routine, in which they are found.

Also document the layout of any data arrays. As even minimal documentation includes the listings of the program, format the program to aid the understanding of its workings; such understanding may be required next in the dim, distant future. It is said that good coding explains itself. Nice, but not true. Comment (REMark) with care and full, clear meanings. Make sure that the REMarks and code actually agree with each other. Do not over comment with REMarks on the obvious (unless its an instructional exercise!).

Finally (on commenting code), do not try to make-good bad code by the use of REMarks; rewrite the code.

5. IGNORING LANGUAGE STANDARDS

Every language has its unbreakable rules of construction, its syntax. BASIC is no exception. As a speaker, to be intelligible, cannot leap from mid-sentence to mid-sentence, so a programmer cannot leap indiscriminately through the code. By ignoring the BASIC's standards (including the foibles of the particular micro operating system in which it is running) we end up with such bloomers as:

Leaping into or out of loops and subroutines.

Using reserved words (ie. command words or procedure names) embedded in, or as, variable names.

Concatenating (adding together) strings such that they are over the prescribed limit for the system, or that they no longer fit their allocated array storage.

Failing to DIMension arrays.

Failing to set variables to a required value before use, especially on re-entry to subroutines.

Ignoring the GLOBAL effects of the use of variables.

Etc.

Avoiding this pitfall is a matter of practice and attention to detail. It's a modern proverb, but still a good one, "If you are not sure, look it up."

6. MAKING THE CODE DEPENDANT ON THE TYPE OF DATA

Fixing on the precise format of numbers, strings or blocks of data results in a loss of flexibility and simplicity. An inflexible program is one that breaks (crashes) easily. Where a number is required, if the code works solely with numeric values then a stray non-numeric character may cause havoc.

Remember, some people denote their thousands with commas! (1,000,000) and vice versa for non-numeric data. The code should cater for these eventualities. Within the computer everything is held in numeric form so changing between strings and numbers is easy and straight forward. Inflexibility in handling the chosen data form is also dangerous to the health of a program.

Non-integer numbers arising unexpectedly in calculations, the division by zero resulting from a non-anticipated rounding, the string of incorrect length for successful slicing, or the case of the null ("") string disrupting output.

All such instances can cripple a program coded for an assumed precise data format. Similarly, be prepared for incomplete or excess data blocks. For that matter, a program should take note of, and tell the user about, discrepancies in the size of data blocks.

Choose the simplest data format that allows the program to work. If you must use a special case make sure that it is truly a special case.

7. CODING WITHOUT PROVISION FOR BREAK-INS

Should the user wish to stop for any reason, the program should allow for such a break without resorting to the extremes of aborting the program or switching off the computer. Block and segment boundaries are natural positions for break-ins, whilst any keyboard input is the time to accept a cry for help.

Remember that when you stop a program do it safely. Finish data transfers, printer runs, etc, before stopping. Make sure that when the program continues that it takes up its business from a safe stance. Be positive, inhibit the keyboard interrupt but allow for opportunities to halt the program, if only to allow the user to answer a call of nature.

8. RATING THE BEAUTY OF THE CODING OVER ITS EFFECTIVENESS

This pitfall covers an enormous area. Starting at the beginning, keep it simple. Use a program block structure with we4ll defined segments. Ensure that each block has only one entry and one exit point. Incorporate library routines and subroutines whenever appropriate. Write clearly, do not be too clever. Do not sacrifice clarity on the altar of efficiency. Code what you want to do simply and directly. Use round brackets in logical and arithmetic expressions to avoid uncertain or double meaning, even when the computer will accept the expressions without the brackets.

Define a common function where an expression becomes repetitive. Keep the use of temporary variables to a minimum, and well comment those that you do use. Avoid unnecessary branches and the use of conditional branches as a substitute for logical expressions. When a logical expression is difficult to understand try to clarify the relationships. Use GOTOs only to move between logical program segments, and then keep their use to a minimum.

Before making the program faster make it RIGHT, BOMBPROOF and CLEAR. Keeping the code simple often makes it faster! Above all, do not fiddle the code to make it faster, just find a different way of solving the problem. Do not strain to reuse code, look at the program's organisation; repeating a section of code may be the most effective course. Do not patch-up bad code — rewrite it!

9. LETTING ANY ERROR GO UNDETECTED

Error entrapment is a positive activity. It must be born in mind at the initial design stage and acted upon throughout the whole of the programming phase. When error entrapment is treated as an afterthought the whole program may become suspect; one massive pitfall. From the very beginning, define the data requirements and then test that the data are sound and reasonable. Code to make sure that input does not go beyond the defined bounds. Identify bad input and attempt to go beyond the defined bounds. Indentify bad input and attempt to recover from it safely. End data transfer by a positive marker (eg. -1 or "EOD") rather than relying on a count.

Beware the off-by-one errors that arise when using a count to control data transfer, screen or printer output, on inclusion of the count variable in a calculation or logical expression. A regular source of errors is the comparison of values derived from the computer calculations.

Avoid the use of arithmetical conditional statements (IFs). Rather, use logical comparisons, or, at the worst, integer or rounded values. Remember, use logical comparisons, or, at the worst, integer or rounded values. Remember the classic computing comment, "10 times 0.1 is hardly ever equal to 1.0!". When a program cannot work with the data that it has been given, ensure that it does not go on an excursion. Make sure that the program "does nothing" gracefully.

Provide a "drip tray" to catch the "gate crashers" at the end of a selection segment for when every condition fails. A good programmer does not equate the unlikely with the impossible.

10. FAILING TO THOROUGHLY TEST A PROGRAM

Once the program has been written it must be tested. The wrath and scorn of the user left to find the faults in a program are richly deserved. Test the program using the boundary values as well as those within and beyond; include wild data and data of the wrong type.

Check some of the answers by hand. Do not stop the testing after correcting a fault, nor merely continue with the test from where the fault was found. Retest both the segment and the whole program again. It is more than likely that the fault was not an isolated one, the one probably having masked others.

Conversely, the correction of any given fault may well highlight (or create!) other faults. Do not forget all the practices of good programming just because the program is in its final stages. When the corrections become messy be prepared to rewrite whole blocks of code.

11. BECOMING DEEPLY ATTACHED TO A PROGRAM

The most deadly trap of all! The microcomputer is an interactive device; it responds to you almost immediately. The act of programming is the expression of your way of thinking in overcomming a task, be it simple of complicated. The net result is that the program can readily grow to reflect your personality.

As any of us seldom see fault in ourselves, so it can be with a computer program. The more time and effort that we spend on a program the more "perfect" it becomes. When a programmer allows a program to become an extension of himself, he becomes very vulnerable when the program is subject to criticism. In severe cases any criticism, whether constructive or not, is taken as a personal insult. How anything so "perfect" can be faulted is beyond his understanding.

Reasonable conversation can be difficult in such circumstances. Be well aware of this trap. Keep a firm grasp on reality. Do not weave your soul into any program. Refer to the program as the "whateveritsnameis" program rather than as "my" program. Accept criticism in the spirit that it is given. View every requirement for change as a chance to learn more about the skill of programming.

In short, practice EGOLESS PROGRAMMING. An off-shoot of this program is the psychological set. When you have lived with a program for some time certain features of the program become fixed in your mind. When it comes to sorting out problems you just cannot find the causes. The difficulty is that what is there is not what you see. What you see is what you believe is there. The psychological set! When a problem seems insoluble, do something else and come back to it. Get somebody else to take a look. Don't be offended when the error is found. It's an error in the program not in you! Try to develop a genuine self-criticism, it will help your programming style no end.

CONCLUSIONS

Anyone can write small programs but sound, large programs are written only by those whose practices are good and standards high. An effective program (one that does what it was intended to do) is far more important than an efficient program, unless getting an answer quickly is more important than getting it right!

Machine Code movements

Finding it difficult to write 6502 code which is machine independent? MC Hart reveals how to write a Machine Code routine to run on a variety of CBM machines

There is now a plethora of CBM machines, many of which run the same dialect of BASIC but all of which have their internal ROM routines held in different locations making it very difficult for the programmer to write 6502 code which is machine independent.

First there was BASIC1 followed by BASIC2 and BASIC4 in the PETS. The VIC-20 held a version of BASIC2 but in a different location whilst the C-64 also holds BASIC2 but in yet a different location.

Now the C16 and Plus/4 are adding to the proliferation of machines making life for machine code programmers even more difficult. Usually, one has to have a disassembly of the various ROMS and then do a conversion job by hand.

Given the loyalty of the owners of CBM machines it is quite likely that one time PET owners have invested in a C-64 and are now thinking about the newer CBM machines. If they have written any routines in machine-code, then a separate version is required for each machine. To help to tackle this problem, I wondered whether it was possible to arrive at a technique whereby a routine was almost independent of the machine upon which it was destined to run. The solution to the problem certainly makes the code longer as one has to cater for several possibilities. If however you would like your machine code routine to run on a variety of CBM machines then this article can point out a way in which it can be done.

TYPICAL PROBLEMS

Machine code of the type LDA #$00 or a relative branch backwards or forwards (eg BNE$02) is completely machine-independent. The problems which are most likely to occur are one or both of the following:

(i) references are made to subroutines held in ROM

(ii) zero page pointers are used which differ from one machine to another.

Other problems occur as well but these are the most typical.

A SOLUTION

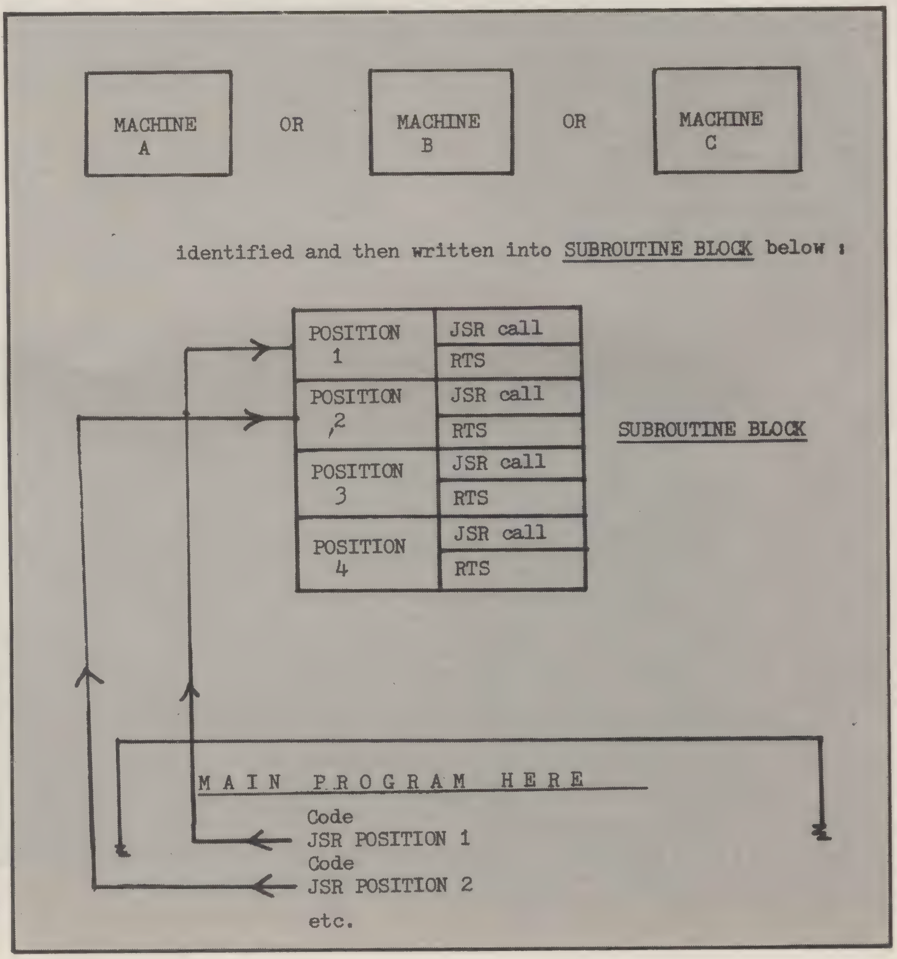
Here, in outline, is the plan of a solution to the problem. This will be illustrated later in an extended example. Briefly, the solution can be detailed in a series of steps:

(i) Put all of the specific calls to ROM subroutines in a block before or after the main program — let us call this the **subroutine-block**

(ii) Identify which machine is in use and then having done so 'overwrite' the subroutine-block with other blocks of code which are appropriate to the machine in use. Each of these subroutines calls should be followed by a RTS as they are to be called from the main program themselves.

(iii) In the main program call each subroutine is required by a specific call to the position in the block where it is to be found.

A diagram may help to make this complicated procedure more clear.



MACHINE CODE

This can help to solve the problem of ROM calls that differ by machine. The other problem of having different zero-page pointers, etc, is more easily solved.

Most of the major pointers in the VIC and the C-64 are three bytes further on in the zero page than their counterparts in B2 and B4 in the PETS. Having identified which machine is in use, we can ensure that a value of 3 is fed into a safe 'store' for the VIC and the C-64 but a value of zero for the PETS. Now to load the pointers to the start of Basic instead of absolute addressing we can use absolute indexed addressing. A safe 'store' is location $02 on all machines. Hence to load the start-of-Basic pointers and assuming that either 3 or 0 is held in location $02 we would write:

```
LDX $02      ... loads contents into X
LDA $28,X    ... loads $(28+3) or (28.0)
                 i.e. contents of $2B or
                 $28
TAY          ... transfer to Y register for
                 safekeeping!
LDA $29,X    ... loads $(29+3) or (29+0)
                 i.e. contents of $2C or
                 $29
```

This is not guaranteed to work for every location on the zero-page ie you need to know your way around the published memory maps but it will take you a long way for the usual pointers etc.

Finally, one needs to use zero-page pointers which are quite usable in any machine. Locations FB-FE are available for use in all machines (but they are also used by the monitor in the PETS and are therefore likely to be overwritten if you are trying to examine their contents when debugging machine code). Other useful locations are the range 50-59 in all machines and the pair $58-$59 are least likely to be grabbed by other parts of the system. Beware of using locations $00-$01 which are quite usable in the PETS but are used to bank in/out parts of memory in the C-64.

One should note that the discussion is aimed at making programs **transportable** between machines which is not the same problem exactly as making the programs **relocatable** (either within or between machines). Routines have been publicised in the past for this particular problem and the assumption made in this article is that routines will generally sit in the same place.

The most common place is the cassette buffer from locations $033C-$03E8 (828-1000 decimal) but of course any area of protected memory will do. Of course the programmer is quite free to make the routine fit as few3 or as many machines as he/she has in mind. In the example which follows I have ignored BASIC1 (are there any left!) and C16 (too new!) and concentrated on the four common makes of machine ie B2; B4; VIC and C-64.

ANOTHER METHOD

It is also possible for the 6502 programmer to simulate the ON ...GOSUB procedure in BASIC and this can be used as an alternative to the procedures outlined above. This will be explained briefly but not elaborated as the method proves a little too cumbersome in practice but uses for it may be found on occasions. The various stages are:

(i) Assume that one subroutine resides at $0380 and an alternative four bytes later on at $0384.

(ii) We now determine the type of machine in use and if we desire the later subroutine put an offset of 4 in the store eg $02.

(iii) We now add the store to the low byte of the first subroutine and put that result in the low byte of a pointer eg $58 and the high byte of the first subroutine into the high byte of the pointer., ie $59. Depending on whether the store contains 0 or 4 the pointer now points to $0380 or $0384.

(iv) We are now going to perform a 'COMPUTED GOSUB' in 6502 or rather to simulate it. We are going to use an indirectly addressed JMP and therefore after the RTS in the subroutine which is accessed the interpreter needs to 'know' where to return to. We do this by pushing the return address **minus one** onto the stack. The reason for this is that after a subroutine the address is automatically incremented by one within the chip and

Example of simulated computed GOSUB in 6502/6510 code

```
033C  CLC
033D  LDA $02
033F  ADC #$80
0341  STA $58
0343  LDA #$03
0345  STA $59
0347  LDA #$03
0349  PHA
034A  LDA #$4F
034C  PHA
034D  JMP ($0058)
0350  continue here ...
.
.
.
0380  JSR 1
0384  JSR 2 etc
```

As you can see, this method is a little cumbersome and also has the disadvantage that the Accumulator is used to push values onto the stack and you may wish to have a value in the Accumulator before you access the subroutine in ROM. In this case, you would be involved in further manipulations to save your temporary value in either the X or the Y registers which in turn might contain values that you wish to pass... However, the routine certainly has its uses on occasions eg as a rudimentary POP command.

AN EXTENDED EXAMPLE LENGTH/TP

A commentary is provided now on the disassembly provided of LENGTH/TP to illustrate the points made in this article. References will be made to the location addresses of the code in the original.

033C-035B After the 'store' is initialised to zero, location $E0BC is tested for the type of machine.

The logic followed is this:
If $E0BC contains $20 then B4 - X holds $72
If $E0BC contains $0B then B2 - X holds $7A
If $E0BC contains $8B then VIC - X holds $82
If $E0BC contains $E3 then C-64 - X holds $8A

The VIC and C-64 code branch to 035C to put an offset of $03 into the store whilst the B2 and B4 join the routine four bytes later on at $0360.

035C-0370 Store the value in X in the low byte of a pointer ($58) and the value of #$03 in the high byte of the pointer ($59) and then transfer over the appropriate code into SUBROUTINE BLOCK which commences at $038A. Then jump (BMI in $0370) to start the routine proper.

0372-0391	Contains two calls into ROM, each followed by an RTS, appropriate to B4, B2, VIC and C-64. This table is accessed by the code in $035C-$0370 and the start point for the transfer depends upon the value contained initially in the X register.
0392-0394	Note the indexed addressing to put the appropriate high byte for the start-of-BASIC into the high byte of a pointer.
0394-03D6	The rest is normal programming, the function of which is to determine the length of a program. Notice that the length of a program is initialised to 2 to take account of the two zero bytes that follow an end-of-line 0 and a count kept in $53-54. ($51-$52 are used to access bytes of BASIC text until three consecutive zeros are found in $03B8-$03BE).
03C0-03C4	Load the X/A registers with the low/high bytes of the 'total byte count' and then access the appropriate ROM routine by calling the **position** in the subroutine block which it occupies.
03C7-03D6	Load the A/Y registers with the low/high bytes of the position from which you wish to print text. In this case $03CF contains ... (space) B Y T E S (return) Note the zero to indicate the end of the string to be printed. Call the ROM routine again by its position in the subroutine block (exactly the same procedure as before).

To run this machine-code routine, use SYS 828.

This particular program, which is far more lengthy than that required for any one machine, will calculate the program length, in machine code, when fed into ANY of the following machines: B4, B2, VIC and C-64. You may feel that it is not worth the bother of writing machine-independent machine-code but if you wish to transfer your cherished routines from one CBM to another then this is one of the ways to do it.

Of course, you do need to be fairly skilled in 6502 code and you also need to be armed with the various memory maps of the machines that you wish to write for. The maps published by ICPUG are generally excellent and these, together with Raeto West's 'Programming the PET/CBM' together help the 6502 programmer to track down the function and location of the various ROM subroutine calls that you wish to access.

If you have come across any useful hints and tips, why not share your knowledge with other CCI readers?

Or maybe you have written a program, either in Basic or Machine Code, that you feel is worthy of publication.

CCI welcomes contributions from readers. We will publish any suitable listings ... and pay you for it!

If you have something for publication, we require the program on cassette or disk, together with a printout of the listing and any additional information required.

Please enclose a S.A.E. if you wish to have your program returned to you.

The address to send it to is:

The Editor,
Commodore Computing International,
Finsbury Business Centre,
40 Bowling Green Lane,
London EC1R 0NE.

Don't forget, we welcome programs for the VIC and PETs as well as the 64.

Windows and mirrors

SETTING WINDOWS ON THE C16

It is described in the user manual that it is possible to set up text windows from the keyboard by using the escape key and 'T' for the top left corner and escape 'B' for the bottom right. In a review that I read on this machine (not in CCI), the reviewer stated that it was not possible to create windows from within a Basic program. Well, here is a routine to do so!

The routine asks the user to input the top and bottom text positions of the window in column, row order and then uses the cursor characters adn CHR$(27) which is the code for escape.

```
63000 INPUT"TOP LEFT";X,Y
63010 INPUT"BOTTOM RIGHT";X1,Y1
63020 CL$="[40CL]"
63030 CD$="[25CD]"
63040 PRINT"[CLS]";LEFT$(CD$,Y);LEFT$(CL$,X);CHR$(27);"T[HOM]";
63050 PRINTLEFT$(CD$,(Y1-Y));LEFT$(CL$,(X1-X));CHR$(27);"B"
READY.
```

LOADING AND SAVING MEMORY FROM BASIC ON THE COMMODORE 64

When loading a block of memory or machine code from a Basic program, it is very annoying that after the load has been completed, the Basic program is restarted and therefore a check to see if the load has occurred must be made.

Following is a short Basic routine that allows the loading of a block of memory without using the LOAD command and the Basic program continues afterwards instead of restarting. To complement this is the save routine.

```
63000 REM BASIC SUBROUTINE TO LOAD A
63010 REM FILE
63020 REM
63030 PRINT"■PLEASE ENTER FILENAME:";
63040 OPEN1,0:INPUT#1,FM$:PRINT:CLOSE1
63050 PRINT"■■■T■APE OR ■D■ISK:";
63060 GETA$:IFA$<>"T"ANDA$<>"D"THEN63060
63070 PRINTA$:D=8:IFA$="T"THEND=1
63080 IFLEN(FM$)>16THENFM$=LEFT$(FM$,16)
63090 POKE183,LEN(FM$):   REM NAME LENGTH
63100 POKE184,D:POKE185,D:POKE186,D:REM DEVICE NUMBER
63110 POKE188,2:POKE187,192:REM ADDRESS OF NAME
63120 FORI=1TOLEN(FM$):POKE703+I,ASC(MID$(FM$,I,1)):NEXT
63130 POKE780,0:REM .A=0 (LOAD) OR 1 (VERIFY)
63140 SYS(65493):REM CALL KERNAL LOAD ROUTINE
63150 IF(PEEK(783)AND1)=0THENRETURN:REM LOADED O.K.
63160 PRINT"■■■LOAD ERROR■ DO YOU WANT TO TRY AGAIN ?"
63170 GETA$:IFA$<>"Y"ANDA$<>"N"THEN63170
63180 IFA$="Y"THEN63000
63190 RETURN
READY.
```

```
63000 REM BASIC SUBROUTINE TO SAVE A
63010 REM BLOCK OF MEMORY
63020 REM
```

```
63030 PRINT"█PLEASE ENTER FILENAME:";
63040 OPEN1,0:INPUT#1,FM$:PRINT:CLOSE1
63050 PRINT"███T█APE OR ██D█ISK:";
63060 GETA$:IFA$<>"T"ANDA$<>"D"THEN63060
63070 PRINTA$:D=8:IFA$="T"THEND=1
63080 IFLEN(FM$)>16THENFM$=LEFT$(FM$,16)
63090 PRINT"██INPUT START ADDRESS TO SAVE:";
63100 OPEN1,0:INPUT#1,SA$:PRINT:CLOSE1
63110 SA=VAL(SA$):IFSA<0ORSA>65535THENPRINT"TTTT":GOTO63090
63120 PRINT"██INPUT END ADDRESS OF SAVE:";
63130 OPEN1,0:INPUT#1,EA$:PRINT:CLOSE1
63140 EA=VAL(EA$):IFEA<0OREA>65535THENPRINT"TTTT":GOTO63120
63150 IFSA>=EATHENPRINT"TTTTTTT":GOTO63090
63160 POKE183,LEN(FM$):    REM NAME LENGTH
63170 POKE184,D:POKE185,D:POKE186,D:REM DEVICE NUMBER
63180 POKE188,2:POKE187,192:REM ADDRESS OF NAME
63190 FORI=1TOLEN(FM$):POKE703+I,ASC(MID$(FM$,I,1)):NEXT
63200 POKE252,INT(SA/256):POKE251,SA-INT(SA/256)*256:
      REM START ADDRESS
63210 POKE780,251:REM .A=INDIRECT TO START
63220 POKE781,EA-INT(EA/256)*256:REM .X=END ADDRESS LOW
63230 POKE782,INT(EA/256):REM .Y=END ADDRESS HIGH
63240 SYS(65496):REM KERNAL SAVE ROUTINE
63250 IFST=0THENRETURN
63260 PRINT"███SAVE ERROR█ DO YOU WANT TO TRY AGAIN ?"
63270 GETA$:IFA$<>"Y"ANDA$<>"N"THEN63270
63280 IFA$="Y"THEN63000
63290 RETURN
READY.
```

64 MIRROR IMAGES

This routine was sent to us by G. Garrard of Scunthorpe, South Humberside.

This program presents the letters of the alphabet upside down and in a mirror image of the entered text.

Line 5 is included so that the program, when entered can be run, checked, modified if necessary and re-saved.

Line 5 can then be removed and the program run as usual.

I find that this approach is the best way to start the listing of any program that leaves the standard character mode.

Line 100, is used to re-create the space character, which enables the screen to show the background colour.

The program peeks into the memory locations of the upper case letters in ROM starting at the top left hand corner of the 'A' then copies them in RAM, starting at the bottom right hand side of the letter 'Z', working backwards, thus reversing the letters of alphabet completely,back to front, top to bottom and 'Z' to 'A'.

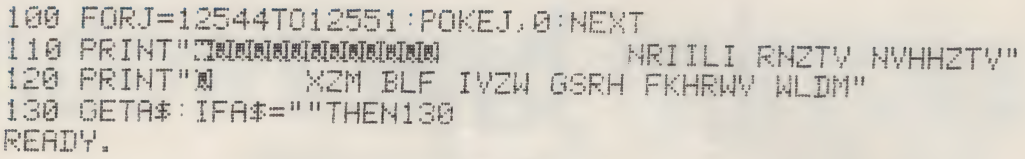
The message printed on the monitor can be read by standing facing the screen and looking down into a mirror held at chest level.

In order to compose the text for use in this program the following pairs of letters must be transposed.

A	B	C	D	E	F	G	H	I	J	K	L	M
Z	Y	X	W	V	U	T	S	R	Q	P	O	N

N.B. The text must be typed in from the last line to the first!!!

```
5 STOP
10 PRINTCHR$(142):POKE52,48:POKE56,48:CLR
20 DIM D(223):POKE56334,PEEK(56334)AND254
30 POKE1,PEEK(1)AND251
40 FORI=0TO223:D(I)=PEEK(I+53248):NEXTI
50 P=223:FORN=12288TO12504:POKEN,D(P):P=P-1:NEXTN
60 POKE1,PEEK(1)OR4
70 POKE56334,PEEK(56334)OR1
80 POKE53272,(PEEK(53272)AND240)+12
```



```
100 FORJ=12544TO12551:POKEJ,0:NEXT
110 PRINT"▣▣▣▣▣▣▣▣▣▣▣▣▣                    NRIILI RNZTV NVHHZTV"
120 PRINT"▣     XZM BLF IVZW GSRH FKHRWV WLDM"
130 GETA$:IFA$=""THEN130
READY.
```

LINE ALTERATIONS

This tip was sent to us by John Consadine of N Ferriby, N Humberside.

Each BASIC command has a unique token value, ie END(128), REM(143) etc. It should therefore be possible to POKE these commands into a program listing under program control for the Commodore range of machines.

I found that the first line of a program could be modified quite easily as follows:—

```
10 REM 12, 13, 14, 15, 16, 17, 18, 19
15 INPUT "TOKEN VALUE"; N
20 POKE 2053, N
```

On running the sample program on a Commodore 64 you are requested to input a value. If 131 is input and the program listed you would find that it now reads:—

```
10 DATA 12, 13, 14, 15, 16, 17, 18, 19
15 INPUT "TOKEN VALUE"; N
20 POKE 2053, N
```

This can be repeated with any Token number from 128 upwards.

So what, you may ask, can we use this for? Useful dynamic changes that spring to mind could be:—

(a) change to REM at beginning of line to temporarily skip the routines on that line.
(b) change to DATA from REM — effectively generates a line of data that was not read before.
(c) change to NEW — as a security measure if unauthorised use of program occurred.
(d) change to STOP — halts program for debugging etc.

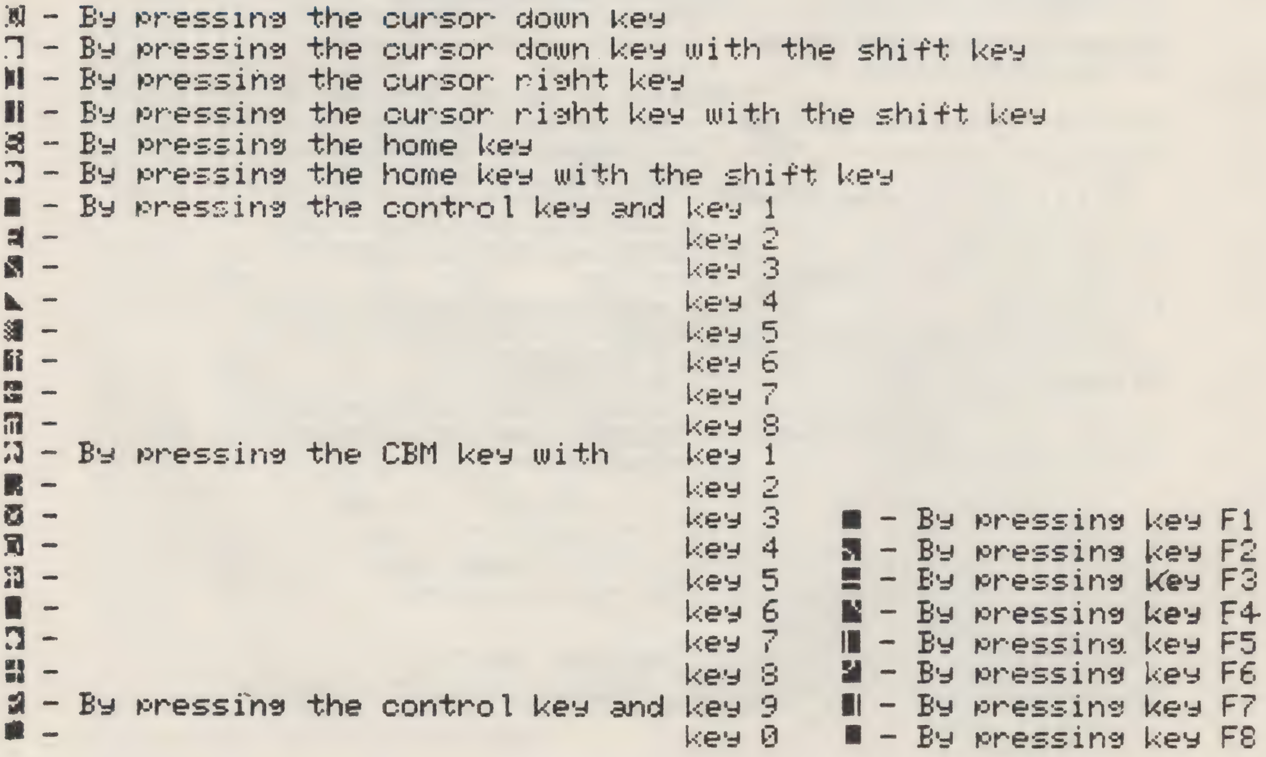
The uses are limited only by the imagination and of course the commands available.

I have tried this successfully on the following Commodore machines:—

PET — POKE 1029, N
64 — POKE 2053, N
VIC 20 — POKE 4101, N

I am sure that with a little ingenuity, someone could suggest a way of altering *any* line in a program.

CURSOR CHARACTERS



```
▣ - By pressing the cursor down key
▣ - By pressing the cursor down key with the shift key
▣ - By pressing the cursor right key
▣ - By pressing the cursor right key with the shift key
▣ - By pressing the home key
▣ - By pressing the home key with the shift key
▣ - By pressing the control key and key 1
▣ -                                 key 2
▣ -                                 key 3
▣ -                                 key 4
▣ -                                 key 5
▣ -                                 key 6
▣ -                                 key 7
▣ -                                 key 8
▣ - By pressing the CBM key with    key 1
▣ -                                 key 2
▣ -                                 key 3   ▣ - By pressing key F1
▣ -                                 key 4   ▣ - By pressing key F2
▣ -                                 key 5   ▣ - By pressing Key F3
▣ -                                 key 6   ▣ - By pressing key F4
▣ -                                 key 7   ▣ - By pressing key F5
▣ -                                 key 8   ▣ - By pressing key F6
▣ - By pressing the control key and key 9   ▣ - By pressing key F7
▣ -                                 key 0   ▣ - By pressing key F8
```

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Computer gardening

The 64 is growing a green thumb.

A new software and book package from Blandford Press brings to the market a new use for the home computer — gardening. The first part of Plan and Design Your Garden lets the user program the dimensions of the garden into the computer and then experiment with designs by adding, taking away or moving various features. The program then stores the information for amending at a later time.

Part two is a diary giving advice about what should be done in a garden during a particular month for a wide range of plants. The package, including the book, retails for £14.95.

Blandford also has Prediction Birthday File with software that gives the birth dates of international personalities in many fields and matches them with their star signs. The owner also can enter his own birthday and request a list of characteristics generally associated with that astrological sign.

The program also serves as a memory aid so that a user can request a listing of all the birthdays he has entered for any one month. Price is £12.95 for book and computer program.

Contact: Blandford Press Ltd, Link House, West Street, Poole, Dorset BH15 1LL. Tel: 0202-671171.

The choice is yours

No longer need you plug, unplug and replug your choice of expensive electronic toys into your television set between uses.

Ross Electronics of London has developed the RF-170 television control centre that allows television, videorecorder, home computer, video game, cable television or another facility to be plugged into one unit. The owner then can choose which facility to be used.

The RF-170 has six inputs, one phono and five co-axial, that can be interconnected through six slide switches. The RF-170 with switching chart retails at about £31.95 incl. VAT.

Contact: Ross Electronics, 49/53 Pancras Road, London NW1 2QB. Tel: 01-278 6371.

The plot thickens

West based Penman Products is introducing a new plotter for personal computers that operates by "robot".

The two-part unit is called Penman-The Unique Robot Plotter and operates alternately as a three-colour plotter, high resolution printer with character size variable, desk-top turtle or precision robot. The plotter automatically adjusts to the baud rate of the host computer, the 64 in the case of Commodore machines. It runs at up to 50mm per second.

The five-inch square robot portion fits into the larger control box for storage and the robot can switch among its three pens in mid-line without affecting the smoothness of the lines whether straight or circled.

Penman interfaces with several business programs as well as being useful for home and technical work. The company also is working on several of its own programs to run on the 64 using the plotter. Penman sells for £217 plus VAT.

Contact: In UK and elsewhere — Penman Products Ltd, 8 Hazelwood Close, Dominion Way, Worthing, West Sussex BN14 8NP. Tel: 0903-209081. In US — American Micro Products Inc, 705 North Bowser, Richardson, Texas 75081. Tel: 214-238-1815.

Musical 64

A new computer music keyboard from Siel bypasses clumsy wiring by plugging directly into the 64 computer.

The 49 note keyboard of the CMK 49 uses the SID chip inside the 64 for all music synthesis and allows 99 monophonic or polyphonic sounds to be created and then stored onto disk or cassette. The creation pages are equipped with full ADSR, DCO and modulation parameters, and sound can be played by the keyboard and then changed as you create new tones.

A MIDI Master Keyboard function allows the Siel MIDI computer interface to be added and to control MIDI equipped instruments. Including user guide, keyboard and software on cassette or disk, the package sells for £125.

Siel also has an MK 900 MIDI keyboard with dual voice generation, manual and programmable rhythms and note data transmission. Retailing at £449, it also has a demo song internally set. A MIDI 16 track live sequencer program, also from Siel, is capable of real-time polyphonic recording with monitoring of previous tracks during recording. On the 64, it handles about 9000 MIDI events and sells for £64 on cassette or £69.50 on disk.

Contact: Siel (UK) Ltd, AHED Depot, Reigate Road, Hookwood, Horley, Surrey RH6 0AY. Tel: 02934-76153/4.

In a flash

Supersoft is following the demand for faster loading disk drives with a new hardware-based product called 1541 Flash.

Designed for the Commodore 1541 disk drive (did you guess?), the device consists of a module that plugs into the 64 and another that fits into the disk drive. Supersoft's Peter Calver says the company actually rewrote part of the disk operating program to make 1541 Flash work. The company already has incorporated a turbo-loader in much of its software including the spreadsheet Busicalc 3.

The 1541 Flash speeds up the process of all disk operations, Calver says, up to more than three times the normal speed in the case of loading programs. The device is said to be an improvement over previous software-based disk drive fast loaders because it is more compatible with software.

Flash, which already is in use in the US, is expected to be available in Europe in January, retailing at £89.95 incl. VAT.

Contact: Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. Tel: 01-861 1166.

Wipe out

A new EPROM eraser from Ground Control has been designed specifically for use with home computers.

The UVIPAC (TS) is housed in a compact plastic case that holds up to three EPROMs. The chips are inserted into a foam pad and inserted into the unit.

Using the standard ultra-violet light, the UVIPAC (TS) completes the erasure in about 15 minutes whether voltage is 230 or 110. A sounder beeps when the time has elapsed and the unit switches off automatically.

Ground Control also offers erasers with the timer only, called UVIPAC (T), and the UVIPAC comes with no timer at all. Prices of the new UVIPAC (TS) range from £21.45 in the UK and £20 in Europe to £23 in the US and £24 in other countries, all inclusive of VAT and posting.

Contact: Ground Control, Alfreda Avenue, Hullbridge, Essex SS5 6LT. Tel: 0702-230324.

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Assemblers assembled

We have received numerous letters from readers wanting to know more about assemblers. Programmer Kevin Bergin explains what an assembler is and does and recommends a few of his favourites

It could be simply argued that Assemblers are just another tool for the programmer, a utility, or that they are a complete Language (like Basic). It is not so important which view you take; the fact is that Assemblers are a powerful and complex aid for programmers.

The name gives us a hint of their main function. They are, in general, used to assemble instructions into a form that the computer will understand. Using the 64 as our example, the best place to start is at Power Up. When you switch your 64 on it goes through a number of steps to see what peripherals are connected, such as Tape, Disk and Printer. Having done this, various areas are assigned — the area from 2048 decimal $0800 hex to 40960 decimal $A000 hex is RAM (random access memory).

An area of ROM (read only memory) is set aside for Basic (Basic ROM). This enables us to use a cross between English and a language the 64 can deal with. In general this is the advantage of Basic and other high level languages; that it is fairly easy for an ordinary human to understand and use, without being a so called 'whizz kid'!

The 64 has an operating system, which is simply a huge program that does all the housekeeping for you. It takes care of Tape, Disk, or any other peripheral communication. It also takes care of Basic for us. It keeps track of our programs as we type them in and keeps track of the line numbers. The point to be made is that the 64 not only allows us to use a very friendly way of communicating with the 64, but also takes care of the complexities at 'RUN' time.

When your Basic program is ready for testing you simply enter RUN, and away it goes. At this point the operating system has to translate the code and execute the program, as well as making decisions on errors. In general then, our Basic programs are converted into Binary (Base 2) and then executed. If you can imagine switching on your 64 and then having to enter every instruction in Binary, then you can see why we have high level languages like Basic and also why we have Assemblers!

Assemblers v Basic

Assemblers are used to generate Machine code programs. That is, they allow you to use a kind of high level language like Basic to generate a totally Binary program. The advantage of using an Assembler rather than writing in Binary, are, of course the same as outlined for Basic. The difference between Basic programs and Machine Code is generally the speed of machine Code — in some cases more than one hundred times faster than Basic. Also the amount of memory used by Machine Code programs is a great saving on Basic usage, which is why most commercial progams are written in Machine Code.

Of course it is not essential to have an Assembler to generate Machine Code. You could do it from Basic by 'poking' the decimal numbers into the desired locations. This is very tedious and difficult to edit, though.

There is also another piece of software closely associated with Assemblers, called a 'Monitor'. No not a VDU type monitor, but a program that allows you to enter, inspect and edit Machine Code at origin. Most programmers use Machine Language Monitors (MLM) heavily, to try and test routines, as well as to inspect the status of the 64 on various operation.

Monitors are in general not very friendly. One mistake could well cause the 64 to hang up, and you will then lose the program, without any error message or reference point to the error. So if you are not very sure about the program you're writing, or new to Machine Code then an Assembler is a must.

How to use Assemblers

Well, if you are new to this are you will find this a little frustrating. On the one hand, you can go and purchase an Assembler and jump straight in, by trying some programs of your own and examples from manuals or magazines. But to get a good understanding of Machine Code and your Assembler you will need to buy at least one good book, and perhaps some patience!

There is, by now, a vast amount of written material on Machine Code particularly on 6502 programming. You will need a book on 6502 programming, as the processors in the VIC-20 and the 64 come from the 6502 family. In my humble opinion, choosing your first book will not be difficult, despite the huge choice. Most of the books on 6502 programming are to say the least 'Mickey Mouse' and should be filed under 'bin'!

This does leave us with two excellent authors; firstly '6502 programming' by Levental and a range of books on 6502 programming written by Rodnay Zaks and published by Sybex. Arming yourself with a book by one of these authors will assist you greatly in your early efforts. In fact, Zaks work has become my technical Bible.

Having equipped yourself with these essentials, you can proceed to learn about the way the processor works, and the instructions used to write your own programs. The 64 has about 56 different Machine Code instructions. You will need to be familiar with most of these to produce good programs.

What's available

There are quite a few Assemblers around for the 64 now. They fall into three categories. The first group are professional Assemblers. These are usually disk based and at least have an Editor, a Machine Language Monitor and an extensive Manual — they are fairly expensive.

The second group could be called a beginners kit, being tape based and not so extensively documented, but much cheaper.

The third category can be explained very easily. It comes under the heading of a useless rip-off and that is the only mention it gets.

The Professionals!

MIKRO 64

A look at three of the best Assemblers available for the 64 should shed more light on the subject as well as sampling the delights of Assemblers. Firstly a cartridge based Assembler called Mikro 64 from Supersoft (Winchester House, Canning Road, Wealdstone, Harrow HA3 7SJ) and written by Andrew Trott. It sells at £57.50 and is not cheap although it is probably worth the expense.

As Mikro 64 is cartridge based, setting it up is extremely painless. The cartridge is plugged into the cartridge expansion slot and becomes active when the 64 is switched on. With the cartridge in place the 64 Poewrs up into the Editor of Mikro 64. The editor in Assemblers is the area used for writing and editing the 'source' code. This is done in much the same way as writing a Basic program — line numbers are entered and the instruction or comment. When the source code is completed it should be saved onto tape or disk before Assembling.

To assemble the program is a matter of entering the command 'Assemble'. Mikro 64 is a three pass Assembler, it will output the assembly listing and the machine code in hex to Printer, Tape, Disk or the screen. Any errors in the source code are usually generated on the third pass, an error message is given and the assembly aborted.

Having Assembled the code, the user

may enter the built in Monitor to inspect, edit and save the Object code. Mikro 64 uses the full 6502 instruction set with several Pseudo Ops. These are instructions that do not get assembled but are used by the Assembler.

The two common Pseudo Ops are '*' which sets the start address of the program and Labels which are used for forward/backward reference also for reading data. Mikro 64 also supports the following labels: 'BYT', this stores 8 bit values or ASCII equivalents directly into memory. 'WOR' is similar to 'BYT', but the values are 16 bit and are stored in lo-hi form. Using the Pseudo Op 'TXT', strings of characters may be placed in memory.

For long programs there is a 'LNK' instruction which allows one file to be Assembled into memory directly after the first. The 'OUT' instruction is used to direct assembly outut to any peripheral.

Finally Mikro 64 offers some Editing commands. 'NUMBER' will convert any number from 0 to 65535 to decimal, hexadecimal, octal and binary. There is an 'AUTO' function which gives you automatic line numbering from the editor. 'DELETE' will delete blocks of lines from the program. The 'FORMAT' command will make your listing more readable and can be used to screen or printer. Lastly 'FIND' will hunt through your program for specific instructions.

Lastly there is user manual with Mikro 64 which is adequate though small, perhaps more examples and greater explanation would have been helpful. The only downfall on this product seems then to be the documentation and possibly the price, depending on what you would expect to pay!

COMMODORE ASSEMBLER DEVELOPMENT PACKAGE

The second Assembler is from Commodore and comes on disk with an extensive manual. Priced at £24.95, it seems good value for money!

There are again several parts to the package and, unlike Mikro 64, each part needs to be loaded and initialised. This means lots of disk access. Commodore have supplied a DOS support program to aid the user by adding commands that give easier disk access. This would seem to be the first program to use.

Conveniently there is a 'boot' program on the disk just load this and run it and it will install and initialise the DOS wedge for you. Most of the extra or alternative DOS commands are prefixed by the '@' symbol. So to collect the disk status simply enter '@'; to read the disk directory without writing over the contents of the Basic area, enter '@$'.

Most other disk commands can be achieved by using the '@' instead of the 'OPEN' and 'CLOSE' commands. Again the first part of the Assembler is the Editor, this must be loaded using ',8,1' and called with an SYS instruction to initialise it. As with Mikro 64 the use of labels is allowed and most of the editor's format is the same as Mikro 64.

To save and load source files the commands 'PUT' and 'GET' are used. The 'AUTO' command gives automatic line numbering. There are some instructions for printer: having directed output to the printer the pages can be omitted with the 'SKIP' command and the length of the PAGE is controlled with the 'PAGE' command.

To assemble your source code you must load and execute the Assembler, a file name is requested for the Object code and you are given an option of a printout and a cross reference. Finally the source filename is requested and Assembled. On assembly, any errors are given along with a symbol table. The object file is placed back onto disk under the name given.

This is not the end of the process. If you have successfully written and Assembled a program you still need to get at the object code. There are two Loaders on the disk, a hi-loader and a lo-loader, these are used to

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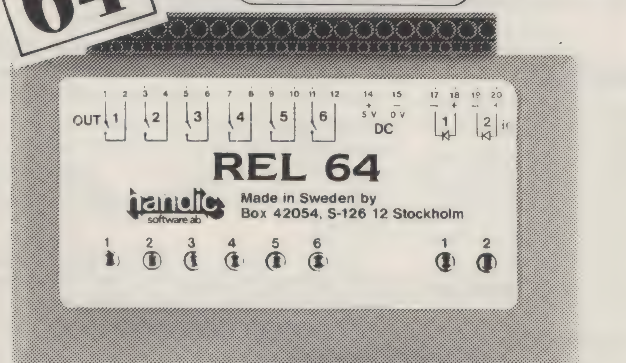

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load the assembled code into the area of memory they were assembled in and then create the Machine Code.

Ah now you have the code? No, I'm afraid not. You need a Monitor (MLM) to save off the code. Commodore have supplied two of these, they load into different areas of memory. Using one of these you may look at edit/ and to your final version and save it to disk. Phew! Yes, that's it!

Although this is a very good Assembler it is not very compact and the operations involved can take some time. The advantage over Mikro 64 is the flexibility and certainly the huge, well written manual, Oh not forgetting the price difference!

PAL 64

The third and final of the 'professional' assemblers reviewed purports to be friendly if the name is anything to go by! PAL 64 is written by Brad Templeton and produced by Pro-Line Software. It is of American origin, but is distributed in the UK by Kobra Marketing, and retails at £69 plus VAT.

PAL 64 is a disk based Assembler and comes with a disk and a manual. The manual is well presented and covers everything you need to know from loading the Assembler to relocating the code.

Though compatible with Commodore's CBM/MOS Assembler this one has some differences. It is possible to relocate not only the user code but also the Assembler, or to have it burnt onto ROM. Instead of the usual Editor Assembler files, PAL is loaded into the 64 and you can then write, Assemble, Save/Load and Test code, without having to load access any other files.

Written in the Basic area the source listing can be mixed with Basic programs. The first statement in any source listing must be SYS700. At RUN time this calls the Assembler, generates the code and places it in the area of memory specified.

The Assembler makes two passes, on the second of which the code is generated and the Assembly listing is displayed, along with any errors encountered. There is, of course, the option of outputting the Assembly to Tape, Disk or printer. Have Assembled the code and saved it, the Object code can be tested with an SYS to the start address of the program.

The source code expects no formatting, it sorts through the listing when the assembler is executed and formats the listing. If a start address is omitted PAL places the code at $C000 hex 49152 decimal onwards. PAL supports the full 6502 instruction set as well as Psuedo Ops.

A manual takes the user through the process of loading, writing and running code with PAL, with program examples and memory maps. There is also a section on relocating PAL, using tape with the Assembler and converting other assembler output to PAL.

The Assembler is not in the usual format, but is fast and easy to use, to say nothing of the immense flexibility it offers compared with other Assemblers. The only disadvantage I could find was the time a newcomer may need to get used to this Assembler. Certainly other software houses may learn something by looking at the way the documentation for PAL has been put together!

Assemblers for beginners

MASTERCODE

Two Assemblers here that do not live up to the standard of the three above and are limited in use being tape based, but are very cheap and would serve as a good tool for the newcomer to Assemblers.

The first, is Commodore 64 Mastercode Assembler from Sunshine, written by David Lawrence and Mark England. You may well recognise the names as they are both authors of several computer books.

This does not guarantee that they have produced a good piece of Software though! Lets have a look . . .

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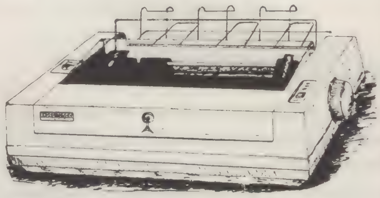

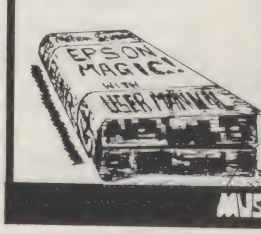

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Tel: 0279 39576

Payroll Master *— puts you in control* small 27 page manual. Quite a lot of the manual is given over to tables and examples displays (where are the program examples?).

The features offered with Mastercode are: a Machine code monitor, a disassembler, an Editor and the Assembler. The program is loaded and initialised in the time honoured fashion, 'SHIFT & RUN/STOP'. This takes about 11 minutes (make some tea!). During this process the border colour changes, which at least lets you know something is going on.

At this point you must inform Mastercode of the peripherals connected. The program the enters the 'menu' which gives you access to all of the features mentioned. You may at this point use the menu to modify the contents of an area of memory, disassemble an area of memory, execute a Machine Code program, LOAD/SAVE a Machine Code program and trace execution of a Machine Code program.

The Editor is also accessed from the menu. Lines are automatically inserted and the source file goes on being created until the user gives two carriage returns, which takes you back to the menu. There are other options from the menu to list source files and edit source files (tedious and slow).

The Assembler is a two pass job and will assemble to memory or assemble without placing the code in memory. The assembler uses the full 6502 instruction set and seven Pseudo Ops. There is a reloader file which places in effect allows the user to relocate code. Mastercode seems to do everything it promises albeit slowly and clumsily.

in Basic, 'BYT' as with Mikro 64 this allows an 8 bit value to be placed directly into memory.

Source files may be saved with the 'P' command and loaded with 'G' command. Object files are saved with the 'S' command and loaded with the 'O' command.

Having finished creating your source code it is assembled by entering 'A', two passes are made and errors encountered are given. The assembly may be stopped during output by pressing 'S'. The object code is then saved to tape or disk in the way described above. It is then a stand alone machine code program and may be loaded back into memory and executed. The Editor/Assembler offers other Psuedo Ops and Editor commands plus a comprehensive manual with full error messages.

Unlike Mastercode there is no Machine code monitor, but you do have adequate edit abilities and the whole package is very well organised as well as being fast.

That's it for commercial Assemblers, but if you happen to be broke or confused then read on! User groups are now fairly common and can often by helpful. The best for Commodore products is ICPUG. They carry many public domain programs and commercial programs at discount prices. Icpug currently have several Machine Language Monitors that are public domain and can be obtained for the cost of Postage and packing. The best of these is Supermon 64 by Jim Butterfield. Icpug can be contacted through Mike Ryan, 164 Chesterfield Drive, Riverhead, Sevenoaks, Kent TN13 2EH.

Here are some of the other assemblers available to Commodore owners:

Osirisan Symbolic Assembler, Disassembler, Editor Package, for VIC 20 and 64, (£19.95 cassette, £24.95 disk), from Elmhirst Enterprises, 99 Porchester Road, Hucclecote, Gloucester. Tel: 0452 64938.

Zeus 64 Assembler and Editor Package, (£9.95 cassette, £14.95), from Design Design, 2 Ashton Way, East Herrington, Sunderland SR3 3RX. Tel: 061-205 6603.

Assembler 64, (£7.99 cassette, £11.99 disk), from Dynamite Software, BCM 8713, London WC1N 3XX.

2/4 Pass Machine Code Assembler, (£5.50 cassette), Mushroom Software, 193 Rommany Road, London SE27 9PR. Tel: 01-670 3533.

Arrow Plus C64 Assembler, Disassembler (£24 cartridge), **Arrow C64** (£16 cartridge), **Help C64 Disassembler** (£15 cartridge) and **Super Help C64 Symbolic 2 Pass Assembler** (£25 cartridge), all from Stack Computer Services, 290-298 Derby Road, Bootle, Liverpool L20 8LN. Tel: 051-933 5511.

Assembler Tutor, (£29.95 cassette/disk) and **Assembler Development Package**, for 64, (£24.95 disk), from Commodore UK, 1 Hunters Lane, Weldon, Corby, N Hants NN17 1QX. Tel: 0536 205252.

HS-64 Assembler And Program Development Aid, for C64, (£47.83), from JCL Software, 1 Sheffield Road, Southborough, Tunbridge Wells, Kent. Tel: 0892 27454.

Pulse Assembler, fro C64, from Interceptor Micros, Lindon House, The Green, Tadley, Basingstoke, Hants. Tel: 07356 71145.

64-EDITOR ASSEMBLER

Another tape based Assembler, this one is jointly produced by Duckworth and Bug and is priced at £12.95. (I must at this point mention a 'distant' interest in that I have and continue to write for Duckworth, I am also fairly familiar with their Editor Assembler.)

To load the Assembler Editor again press SHIFT & RUN/STOP. Loading will take about three minutes. After loading is complete, the screen will display a list of the editor commands. If the user exits the Assembler at any time a GOTO 200 will re-enter without any loss of data.

When the Edit/assembler is initialised you are in the editor. Line numbers are consecutive integers beginning with 1. The operand is bracketed [] to indicate that it is optional (there are instructions which do not use operands). the mnemonic is any mnemonic from the 6502 instruction set.

Lines may be inserted and deleted using the format 'D 1-10'. This will delete lines 1 to 10 inclusive the insert command works in the same way. All lines are renumbered after an insert operation.

The Editor/Assembler supports the following Psuedo Ops; 'STR' allows entry of a string of characters, 'REM' for comments as

An extract from The Naked Computer (Arlington Books) — a review follows next month

Computers are good for us. The US Bureau of Labor Statistics predicts that out of 340 occupations, computer-related jobs will lead in growth, pay scales, and number of jobs opening up during the 1980s. Demand for computer-savvy people is so hot that one out of four computer specialists changes jobs every year, the average computer department is 20 percent understaffed, and companies offer bounties of up to $1,000 for employees who coax friends to work for them.

In 1975 there were three specialists for every computer; in 1985 there will be one hundred computers per specialist. The care and feeding of the beasts has become big business.

Over the past ten years American companies have spent over $500 billion in 1982 for data processing staff salaries, mostly for writing programs, reports International Data Corporation. Yet over 65 percent of those programs are rife with mistakes. Although computer hardware price performance improves 30 percent a year, programmer output increases only 2 to 3 percent a year. Our point: There'll always be plenty to do if you have a computer-related job. So get one. Sha na na na.

Practical calculation

American software house Practicorp has released an expanded, updated version of its Practicalc program first introduced in 1983.

The complete program packs spreadsheet, word processor and database into one working document, if necessary. The word processor is one of the major improvements over the original Practicalc.

The 100 column spreadsheet feature can contain up to 250 rows of information and offers more than 30 mathematical functions. In addition to keeping business accounts, the spreadsheet can be used to program a homeowner's budget or sort and graph organisation records. Lines of text in the word processor can be up to 100 characters long and the program has the ability to justify paragraphs, captions and text. The database arranges information numerically or alphabetically and allows the user to add, delete, change and search for certain data.

Written in assembly language, Practicalc II requires only 48K of memory. Along with an operating guide and a supplement for the C64, the package costs £69.95.

Contact: Practicorp, The Silk Mill, 44 Oak Street, Newton Upper Falls, MA 02164, USA. In the UK, Practicorp, Goddard Road, Whitehouse Industrial Estate, Ipswich, England IP1 5NP. Tel: 0473 462721.

Lab analysis on SX64

CIL Microsystems has come up with a compact package of computer and interface for data acquisition as well as controlling and measuring voltages.

With an application primarily in laboratory work, the CIL system includes an SX64 portable computer and an ADS interface, the latter made by CIL. The interface is housed in the storage slot of the computer with connectors accessible from the front. The interface, which can be programmed in Basic, also is available separately and is compatible with the C64.

The computer includes an integral six inch colour monitor and disk drive and the complete package comes with demonstration software, all costing £1,450. The interface alone costs £500 with installation instructions and £700 if it is installed by a CIL engineer.

Contact: CIL Microsystems Ltd, Decoy Road, Worthing, Sussex BN14 8ND. Tel: 0903 210474.

Smoothing the bumps

A power supply system developed by Essex-based Avel-Lindberg Ltd may protect crucial office computer systems from damage and computer data from errors caused by unexpected power surges or failures.

The AF-10 uninterruptible power supply is suitable for all types of electronic equipment and provides up to 20 minutes of emergency power to cover a failure of the mains supply or other voltage jolts. It is housed in a wheeled compact cabinet which also contains the battery-charger/rectifier, static inverter and bypass switch.

Avel-Lindberg says the unit, which costs £1,980, is quiet enough to be installed next to a computer without disturbing the user.

Contact: Avel-Lindberg Ltd, South Ockendon, Essex RM15 5TD. Tel: 0708 853444.

Mail volume

The large volume of electronic mail and the increasing number of communications options has prompted the US company, Knowledge Industry Publications to release Options for Electronic Mail.

The company claims executives spend as much as 75 percent of their time in "communications-related activities". The new book, written by Libby Trudell of Dialog Information Services two contributing authors, explains and compares the major types of electronic mail services and tries to help the reader understand the new technology. Areas covered include computer-based message systems, the international telex network and TWX network, local networks and software packages for electronic mail and the microprocessor-based hardware products.

Options for Electronic Mail is the latest volume in the Information and Communications Management Guides.

The book costs $32.95 in hardcover and $24.95 in paperback. Knowledge Industry also publishes, with the American Society for Information Science, a Data Base Directory. It is a 608-page listing and description of online databases accessible in North America, available at $120.

Contact: Knowledge Industry Publications Inc, 701 Westchester Avenue, White Plains, New York 10604, USA.

Keeping safe

Few products undergo searing 950 degree temperature tests, except when the question is one of keeping your valuable records from going up in flames.

Levy Safes of London subjected their new disk storage safes to just such conditions for one hour and the company says its product passed the test, remaining below the required 50 degree temperature and 85 percent humidity level.

Called Datamite, the smallest safe is semi-portable, weighing 28 kgs, and stores up to 70 5¼ inch floppy disks or 80 3½ inch diskettes. Datamite retails for £369.

Four storage safes in the Datamate range are slightly larger with two of them, the 300 and 450 models, suitable for microcomputer diskettes. They are constructed as one-drawer filing cabinets either on wheels or fixed support. Each will slide underneath a standard terminal work-station or desk. The two larger versions, 900 and 700, store most larger computer materials.

Datamite and the Datamate range of safes will be on display at the Levy Safes stand at the Which Computer? exhibition in Birmingham 15-18 January.

Contact: Levy Safes, Thavies Inn House, Holborn Circus, London EC1N 2HE. Tel: 01-353 9433.

Heading off confusion

A new advisory service from ADM of Middlesex helps companies deal with the Data Protection Act that became law early last year.

The Act requires all persons and organisations who hold data for automatic processing to register details of the information with a new Data Protection Registrar, who then monitors the accuracy and continued use of the information.

ADM, which specialises in data processing training, has established the new subsidiary — ADM Consultancy Services Ltd — to explain the Act and how to comply with it. The services include a half-day teach-in, a guide to the new legislation and a check list with instructions and memory prompts. ADM will also do the actual work if the client does not have the time or facilities.

In its regular capacity as a training centre, ADM has announced 60 business computing courses for 1985. Eight are for senior and middle managers, and several courses cater to data processors using micros. Eight other courses focus on spreadsheets and databases, and a range of language courses are available for those writing their own software.

Contact: ADM, ADM House, 5-9 Headstone Road, Harrow, Middlesex HA1 1PL. Tel: 01-863 0621.

CLASSIFIED

Irish CBM 64 user wishes to swap software utilities, games and tips. Over 400 titles. Send list of software to: Gerard Giblin, The Lodge, 'Ardsley', Heronford Lane, Shankill, Co. Dublin, Ireland.

Vic 20's: 4 cartridge games £26, 8K RAM £26 brand new, joystick £5, Intro to Basic Part 1 £10. Tel: Imran on (Slough) 823913 5 p.m. to 9 p.m. All the above for £55.

Vectrex, Intellinsion, both have cartridges for sale. Both are less than 1 year old with packaging and manuals. Also anyone with Acetronic and wants cheap cartridges for £7. Tel 01-802 8724. Buyer collects.

Dams IEEE Interface for Commodore 64 £35 o.n.o. Phone (0532) 628307 after 6 p.m.

CBM 64 games to swap. I have over 250 games. Send your list and I'll send mine. I'm specially looking for a disk to tape copier. Tel: Sanjeer 01-904 0667.

Arfon 7 slot expansion board/workstation to sell. Has power transformer to power Vic 20 and itself. Excellent condition £50 o.n.o. Tel: Stuart Mills (051) 260 6218; 112 Boaler Street, Liverpool L6 6AD.

PET 32K. Many tapes, toolkit, games, educational. Books and manuals. Interfaced to telephone as printer. Selling both machines together £185. Jo Smith (Epping) 73424.

Wanted any unusuable or broken computer, cheap, with real keyboard. Keyboard must be in working order. Tel: Mr M West, Bedford (0234) 740332.

CBM 64 owners! Many software titles, some American, all to swap. Write to Andy at 19 Quarry Road, Liversedge, West Yorks, WF15 7HG. Also wanted 1541 disk drive — cheap?

Swap Hitachi tri-mode colour TV, cassette and radio for 4040 or 8050. Also JVC 2" world-wide operation TV and radio for 1541. Phone (0783) 489239.

Wanted — assembler expert SBM 64. I'm a freelance programmer with original ideas and graphic skills. I'm slow at assembler. Be my partner. Increase my output. Make a living. Londoner preferred. Phone 01-987 5476.

Vic 20 + 16K switchable + C2N tape recorder, 9 games including Perils of Willy and Jetpac + Intro to Basic part 1. good working order — £100 Tel: 01-346 3886.

Commodore 64 games for sale of swap. Over 200 games and utilities. Phone Stevenage in Hertfordshire 64485 (Rich or Peter).

I wish to swap my 5-gear races (Bicross Sabre G.T.) for (or similar) 1520 printer/-plotter. Phone 674-4656 (eves).

war/strategy games. Games for sale include Pitfall 2, Arabian Nights, High Noon, Cliffhanger, Beach Head, Conqueror, Armageddon. Steve Christian, 2 Beechdale Road, Liverpool 18.

Wanted 8250 ro 8050 dual disk drive. Phone 0844-52961/53656.

Commodore 3032 computer with 3040 dual disk unit, 3022 printer. All V.G.C. assembler software. Bargain £600. Tel: Brighton (0273) 771577 after 7 p.m.

Vic 20, CBM 64 software for sale. Lots of nifty UK & US stuff. All originals, good prices. For large graded lists please send SAE to John Keogh, 30 Highwood Ave, Finchley, London N12 8QP.

16K RAM cartridge for Vic 20 — £15. Tel: 01-777 5522.

English CBM 64 owner wishes to exchange software with users in the U.S. and overseas (disk only please). Send lists to M Pepper, 11 Thornhill Close, Bramcote Hills, Beeston, Nottingham NG9 3FS. England.

Norwegian CBM 64 owner wanted to swap software. Have already 650 titles. Send your lists. Trond Nordbo, Stoltenberquei, 15, 4000 Stravanger, Norway.

Commodore 64 user has many programs from U.S. SOme not on the market! Games, utilities, business, educational, Public Domain. Send S.A.S.E for list. R. Parry, Little Manor, Haversham, Milton Keynes MK19 7DT. England.

Want you to swap? I want it too!! Over 1500 programs for you (C-64). I would like to swap all over the world. Write soon (disk only) and send your list. Panesi Dennis, Via Ugo Foscolo 6, 56100, Pisa, Italy.

Cassette recorder interface unit (64 or 20) £9. Jeff Cole, 25 Willoughby Court, Peterborough.

CBM owners. Want to swap software (disk only) and ideas. All letters will be answered, please write to Espen Joranger, Dammgardsqt 210, 5031 Laksevaag, Norway.

Commodore 64 wanted — plus add-ons. Swap for Yashica Moultz camera, Moultz projector (super 8), editor, screen, splicer, indoor filming lamp, all in as new condition — 0329-235331.

CBM Easyscript plus six games disks to exchange for Civfile disk or sell. Call (0443) 227056 after 5.00 p.m.

MPS 801 printer. Still under guarantee. Perfect condition. Complete with box of paper. Any reasonable offer. Phone (Burnley) 72533 ext. 276 (day) or (Blackburn) 47200 (night).

Help me — I need a Commodore 1541 disc drive and also any discs compatible with the expanded Vic 20 urgently. Any offers welcome to date. Tel: (Nott) (0602) 472 792 after 5 p.m.

CBM 64 owner wishes to swap software. Send list to W. Atkinson, 7 Silverlands Avenue, Oldbury, Warley, West Midlands B68 8EQ, England. I have 5000 + titles.

Super software for Vic 20 & CBM 64. All original U.K. & U.S. stuff. For large graded lists please send SAE to John Keogh, 30 Highwood Avenue, North Finchley, London, N12 8QP.

CBM 64 owners: will swap Flight Path 737, Aztec Challenge and Beach Head for Bozo's Night out and Arabian Nights or similar: Phone Steve 890-2079.

Wanted: female penpal aged 14-16, must own a Commodore 64, No experience needed (if experienced then all the better) Swap programs etc. Contact Chas, 56 Eversley Park Road, Winchmore Hill, London N21 1NU.

Norwegian CBM 64 ownder wants to exchange software, hints and tips with an American 64er (disk only). Asbjorn Leirvag, Granvegen 2, 4250 Koperisk, Norway.

Vic 20 + **16K** + cassette unit + £90 of software including Commodore, Llamasoft, Bug Byte £100 the lot. Call Ian on 0423-60688 after 6.00 p.m.

Calling all Commodore users in the Manchester area. Come along to out user group meetings. First monday every month. For further details ring Steve on 061-428 3135.

CBM 64 Easy Stock and Future Finance. Unused £50 each o.n.o. or swap for Easy Life/Easy Calc. Tel: 0782 627561 evenings.

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COMMODORE 64 SOFTWARE

DATABASE: Datafile — a database with very powerful options. Includes:- print all/selective records, delete, amend, save, load, copy, alphanumeric sort, user defined fields, memory check, total numeric fields, multi field interrelational, wildcard and search between limits. Multiple file option, and many more. Fully menu driven with complete instructions. Disk and cassette fully compiled. Outstanding value.

CBM 64 (compiled) cassette **£7.45**
CBM 64 (compiled) disk **£10.45**

WORD PROCESSOR: Textfile — powerful word processor. Facilities include:-large text buffer, auto centre text, variable tab, insert, amend, delete, copy, move text, word count, right justify, pageing, join files, multiple file handling, print all/part text etc. Fully menu driven with comprehensive easy to use instructions. Great value.

CBM 64 (compiled) cassette **£8.25**
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All programs complete with full documentation and guarantee and can be used with all direct connect CBM 64 printers including 1520 printer plotter and most centronics (with suitable hardware interface). Prices include VAT. Packing and fast delivery by 1st class mail.
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West Midlands B69 2LF.

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64 PARTY 4...5.99

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All the above games available for the CBM64, BBC'B' and Spectrum 48K — price £7.50 each inc. p&p.

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18 Salford Close, Woodrow South,
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Vic 20, 16K, SE, SLR, m/board, sppech synthesisor, cassette deck, software, books and magazines. £350 o.n.o. Will separate. Hereford (0432) 265507 after 7p.m.

Easyspell for CBM 64. £19. Ring R. Grant (Cranbrook) 240617.

Vic 20 starter pack, 11 games, 32K switchable RAM, joystick, still boxed as new. Worth over £250 — bargain price of £130. Phone (0533) 881677.

Commodore 6 — slot Motherboard and 3K RAM pack — only £30. Will sell separate. Send you offer to G. Unthank, 69, St. Mary's Crescent, Yeovil, Somerset BA21 5RR.

Commodore 64 owner wishes to swap software on tape. A large collection of English and American software. Send you list and state address. Contact Courtney Small, 100 Eastern Avenue, Wanstead, London, E11 3JG.

Commodore 64 user wants to swap programs and tips. Only on disk. Patrick Weiss, Henri-Dunant 5-1700 Fribourg Switzerland.

Wanted — Commodore 64 1520 printer/-plotter. Used and cheap please. All letters answered. Matthew Perks, 116 Oaklands Ave. Oxhey, Watford, Herts WD14 LW or Tel: (Watford) 53409.

Belgium CBM 64 owner wishes to exchange games with other users anywhere. Please send lists to Vanhuylenbroeck Jean, Booglaan 82, Denderleeuw, Belgium.

CBM 64 software for sale, original, as new: Superbase 64 £48; Easyscript £20; Makro assembler £12; many games less than half price. Also wanted Easyspell. Please ring Albert (0865) 54084) (eves or weekends)

64 owner wishes to talk to other 64 owners. games and ideas to swap. Please send lists to John, 11 Rosslyn Avenue, Dagenham, Essex RM8 1JR.

All American CBM 64 owner. Do you want to exchange software? I have lots of European titles. Send your list to Paal Berg, Stouperveien 15, N-3145, Tjome, Norway.

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CBM 64 Busicalc II — disc and manual £40. (0932) 241242.

Dutch CBM 64 owner wishes to swap software on cassette with users everywhere. Many titles. Send list to marcell Dresen, Boxtelsewg 26, NL 5298 VC Leimpole; The Netherlands.

Swap Biolam microscope (cost over £200) and bits. Mag from 70 to 1350, for Commodore printer or printer/plotter. Eccles Clough House Farm, Hebden Bridge, West Yorks.

Sale — Commodore 64 modem £60.00 as new will re-registration for new ID and password for use on Compunet. Tel: 0723-62746 Stephenson.

CBM Software. Titles include Triad, Super Trek, Stellar Wars, Harrier Attack, Havoc, Flak, Transylvanian Tower. Swap or sell. Phone 607-8513 ask for Tony.

Commodore 64 & disk drive + C2N unit, Simons Basic, Forth, word processor, lots of games on disk/cassette. £450, all in excellent condition. Write to Jatinda Sangha, 2 Messenger Road, Birmingham B33 EEB.

Great Commodore 64 software to swap. 100's titles, all types. Disk users please send list to Stephen Howard, 53 Valley View, Rochester, Kent or phone 0634-812833 for a fast reply.

CBM 64 software to swap. I have over 550 programs (disk only). Send list to David c/o 10 Appian Place, Gateshead, NE9 5QR. England.

64 CP/M, Fortran and Cobol £75. 32K PET £300. Half price projector foils for H-P plotter 7470A. SAE for half-price list. Reynolds, 65 Claremont Road, Tunbridge Wells, Kent TN1 ITE.

Vic 20 (with 1 year guarantee) & C2N cassette recorder, 14 original games, Intro to Basic part 1 plus £16 of magazines & books. Tel: Robert Minshall 01-737 7457.

English C-64 owner (currently living in Norway) seeks other 64 users (especially Yanks) to swap software (games) etc. have 100 titles (tape). Please write to Kristian B Watters, Dalen 13, Odda 5750, Norway.

CBM 64 software for sale or swap. Over 370 titles on disc and tape. Many American, e.g. Blue Max, One on One, Hesgames. Tel: Dartford (0322) 331597. Ask for Howard.

For sale: Matrix, Revenge of the Mutant Camels, Sheep in Space, Hunchback, Motor Mania, Hobbit, Moon Buggy, Lazarian, American Football, Siren City, Manic Miner, £4 each or £35.00 the lot. Write to: Cpl T. Ruckwood, Def & SY FLT, RAF Bishops Court (N.I.) BFPO 801.

CBM 8000 series business computer complete with 8050 5'/5" dual floppy disk drive and dot matrix tractor drive printer, stationary and spare ribbon cassettes. Reasonable offers Tel: 054-47-431 after 6 p.m.

I have about 100 comp magazines and stack light pen for sale. Will sell or swap for air rifle, scope and silencer or gun-bag. Tel: (Brighton) 699521 after 6 p.m.

Commodore owner with approx. 200 programs looking for anyone to swap games, hints and info. with. I'm also buying original software. Tel: (Grimsby) 74584 and ask for Martin.

Italian CBM 64 user wants to swap software with someone. I have more than 1200 programs. Send you list to: Fernando Forner 21, Via Valperga Calvso, 10125 Turin, Italy.

Toddlers! Play with your parents CBM 64 — animated, musical FLASHCARD, ALPHABET and SPELLING program developed in conjunction with schools and educational psychologist. Also operates with CURRAH speech synthesizer. French and Spanish cersions also available. Disc £7.50, Cassette £5.00 TODDLERSOFT, 1 Cat Lane, Ewelme, OXON OX9 6HX.

Swap my Weston electric quitar for MPS801 dot matrix printer. Tel: 01-592 4740.

Finnish CBM 64 user wishes to swap software. Write (send your list) to Veli-Pekka Karna, Ristontie 17, 96300, Rovaniemi 30, Finland.

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